Review of EUNIS forest habitat classification

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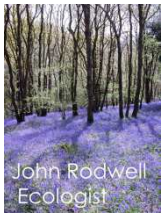

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1 Introduction

The policy area related to the conservation of biological diversity up to 2020 is shaped by the 20 Aichi targets at the global level. Taking into account the Aichi targets, the European Union has adopted the EU biodiversity strategy to 2020, with 6 Targets and a higher number of actions. The implementation of national and EU policies relies strongly on data and information on the state, trends and outlook of all components of biological diversity, including genetic diversity, species and habitats diversity as well as that of ecosystems. Documenting, monitoring and assessing all types of habitats in a harmonised or comparable manner across Europe requires specific classification tools. Two of such tools are discussed in this report in relation to forests: the EUNIS habitat classification and the European Forest Types.

This report is related to forest habitats in Europe. Forest habitats are given priority because of the increased attention and initiatives on the assessment of forest ecosystems and their services at European level and the importance of forests in the protection of biodiversity.

The EUNIS Habitat Classification (Davies & Moss 1999; Davies et al. 2004; Moss 2008), provides a pan-European reference set of habitat types with a common unit description within a hierarchical classification. Crosswalks between level 3 EUNIS habitat types, and vegetation syntaxa were first developed in 1998 (Rodwell et al. 1998, 2002) and updated in 2012 (Schaminée et al. 2013). More work was considered necessary, however, for strengthening the descriptions of species compositions in the units of level 3 by crossreferencing them with alliances derived from real vegetation records. Updating the EUNIS habitat classification is an issue of European importance, especially as it has been proposed as a reference for the INSPIRE Directive (2007), set up to establish an infrastructure for spatial information in Europe to support Community environmental policies as well as policies or activities which may have an impact on the environment.

The European Forest Types (EFT) classification (EEA 2006, 2007), has been developed from a BEAR typology (Larsson 2001) used by the EEA in assessment of forests. Consequently, it was developed for the assessment of progress towards sustainable forest management under the reporting of the Ministerial Conference on the Protection of Forests in Europe (MCPFE-FOREST EUROPE) process. In the latest Forest Europe report, there were 7 indicators based on national data applying the EFT classification as a pilot case. Further work is needed to strengthen the application of EFT, with the update of crosswalks between EUNIS and EFT and the cross-reference with alliances derived from real vegetation recording data.

The European Environmental Agency (EEA) with its European Topic Centre (ETC/BD) maintains the EUNIS habitat classification as part of the EEA Biodiversity Data Centre (www.eea.europa.eu/themes/biodiversity/dc), where

European data sets and information on sites, species and habitats of Europe are published.

EEA has anticipated a review of the existing scientific basis for the EUNIS Habitat Classification and the European Forest Types classification, as part of the current review of information relating to habitat types and ecosystems. More specifically, the project will use large vegetation sampling datasets to review the EUNIS Habitat Classification with regard to forests and the European Forest Types. The outcomes will inform and support decisions required of the EEA and EIONET on the further maintainance of these two classification tools, related to forests.

The objectives of this project were specified as tasks in the Annex I of the project specification (EEA/NSV/13/005) and elucidated in the Inception Report (May 2013, Service Contract No. 3512/B2013/EEA.55380):

- **Task 1** To determine and provide the floristic composition of forest vegetation syntaxa at the level of alliances of the EuroVegChecklist using the available vegetation databases and published sources

- **Task 2** Based on the results of Task 1, to review and provide the descriptions of habitats at level 3 and propose improvements of the EUNIS forest habitats classification as well as to provide for relevant updates to the EUNIS-EuroVegChecklist crosswalks

- **Task 3** Based on the results from Task 2, a) to review the EUNIS/European Forest Types crosswalk and, if necessary, make proposals for revisions; b) to provide recommendations on how the work carried out would contribute to organising further a European-wide in-situ data collection for assessment of forest ecosystems (e.g. assessment of trends in forest habitat quality, linking in-situ measurement to earth observations)

- **Task 4** To prepare and present an Inception Report on Tasks 1 and 2 as the basis for discussion in the inception meeting and revise it if modifications are agreed in the inception meeting

- **Task 5** To participate in two meetings with the EEA (dates to be agreed bilaterally), the first being the inception meeting and the second a progress meeting

2 Linking the EUNIS habitat classification and vegetation-plot data – Task 1

2.1 Background

The most detailed and comprehensive classifications of vegetation types across Europe are provided by phytosociology, the tradition which uses small-scale vegetation-plot data on plant species composition and cover for 'bottom-up' fine-grained delimitation and characterisation of plant associations (Braun-Blanquet 1928; Tüxen 1937). The latest estimates suggest that the total number of such plots in Europe exceeds 4.3 million (Schaminée et al. 2009) and there is an enormous phytosociological literature describing and classifying vegetation types from many countries in the EU and beyond.

Although formal rules exist for naming plant associations and organising them in higher syntaxonomic units of alliances, orders and classes (Weber et al. 2000), their delimitation remains incomplete and contentious due to various theoretical constraints and methodological problems. In an attempt to achieve a respectable level of stability, the European Vegetation Survey (EVS) developed the first overview of European vegetation units at the levels of alliances, orders and classes, published in The Diversity of European Vegetation, funded by the Dutch National Reference Centre for Agriculture, Nature and Fisheries (Rodwell et al. 2002). This created a pragmatic framework which has gained widespread respect among practitioners and environmental policy players across Europe. This framework could also provide an important standardising tool for the European Environment Agency to support assessments of vegetation and habitats.

Meanwhile, the EUNIS Habitat Classification (Davies & Moss 1999) brought structural redefinition and simplicity to the Palaearctic Habitats Classification (Devillers & Devillers-Terschuren 1996) that extended the geographic coverage of the CORINE biotopes programme to provide a foundation for the Habitats Directive. Effectively, EUNIS provided a comprehensive hierarchical classification of the terrestrial and freshwater habitats for the whole of European continent and associated islands. Cross linkages have enabled users of other habitat classifications to relate their national schemes to the international level, in particular to the Annex I habitats of the EU Habitats Directive.

The development of the EUNIS Habitat Classification (Davies & Moss 1999) afforded a fresh opportunity to provide a sound scientific cross-reference between widely accepted European habitats and phytosociological definitions of vegetation types. An EVS team developed a cross-walk between phytosociological units to the level of the alliance and EUNIS habitats at Level

3. The Scientific Background to the EUNIS Habitat Classification (Rodwell et al. 1998) provided a complete overview of European vegetation types to the level of alliance, accompanied by brief verbal definitions of these units, and crosswalks from the EUNIS3 habitats to the syntaxa and vice versa, which were included in *The Diversity of European Vegetation* (Rodwell et al. 2002).

Since the original cross-walk was developed, there have been only relatively modest changes to the EUNIS Habitat Classification (Evans, personal communication). However, the overview of European syntaxa has undergone substantial expert revision by a team under the leadership of Professor Ladislav Mucina. The new product, the EuroVegChecklist, is more comprehensive (covering all Europe as well as territories such as Azores, Canary Islands, Cyprus, Caucasus and Greenland), scientifically robust, better grounded within current phytosociological understanding, and more meaningful for application within the user community.

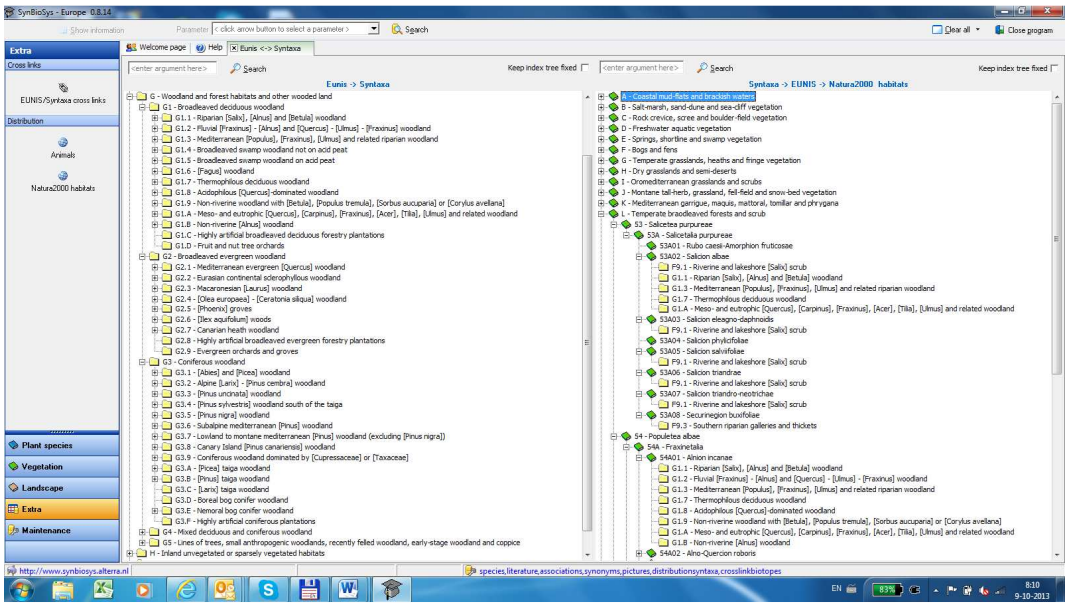

Figure 2.1. Screen shot of SynBioSys Europe*, showing the crosswalks from EUNIS to syntaxa (left panel) and syntaxa to EUNIS (right panel).*

Future crosswalks between EUNIS and syntaxa will be implemented in the information system SynBioSys Europe (Schaminée et al. 2007), as was done for the 1998 and 2002 versions and has been indicated in the 2012 report on the development of vegetation syntaxa crosswalks to the EUNIS habitat classification (Schaminée et al. 2012; see Fig. 2.1). This desktop tool, an initiative of the European Vegetation Survey (EVS) coordinated by Alterra (Wageningen, The Netherlands), integrates different biological levels: species, community and landscape. It incorporates a GIS platform for the visualization of the various layers of information, enabling the analysis of patterns and processes relating the individual levels. For the individual levels of the

system, specific sources are available, notably national and regional Turboveg databases (Hennekens & Schaminée 2001) for the community level and data from the Map of Natural Vegetation of Europe (Bohn et al. 2000-2004) for the landscape level. The structure of the system and its underlying databases allow user-defined queries.

2.2 Vegetation-plot data (relevés) as a scientific basis for habitat classification

The plot samples that have been traditionally collected by phytosociologists (Braun-Blanquet 1928, Mueller-Dombois & Ellenberg 1974) provide the most numerous and widely dispersed in-situ records of vegetation across Europe. Comprising at minimum a list of vascular plant species with estimates of cover-abundance in plots ranging from less than $1m^2$ to a few hundreds m^2 (Chytrý & Otýpková 2003), such samples are dated and spatially located in a way that gives a record of the composition of vegetation at a particular time and place. In phytosociology, they have formed the basis of the classification of vegetation into associations organised into the hierarchies referred to above, and have thus helped furnish inventories and maps of sites and accounts of the vegetation of countries and regions (e.g. Rodwell 1991 et seq.; Mucina et al. 1993; Schaminée et al. 1995 et seq.; Valachovič et al. 1995 et seq.; Chytrý 2007 et seq.). In addition, vegetation plots have often been sampled for other purposes such as resource assessment and the monitoring of vegetation and landscape change (Smart et al. 2003; Esseen et al. 2007).

Various enquiries within the EVS and beyond (Rodwell 1995; Ewald 2001; Schaminée et al. 2009) have provided an insight into the patterns of accumulation of vegetation plots across Europe over the past 90 years. The latest estimates (based on data from 32 countries) suggest that, as mentioned before, more than 4.3 million vegetation descriptions have been recorded (Table 1). Most of plots have been made in the countries of central and western Europe, particularly Germany, the Netherlands and France, but considerable numbers were also estimated for Poland, Spain, the Czech Republic, Italy, the United Kingdom and Austria (Schaminée et al 2009).

The development of compatible software tools, one of the EVS core work objectives, greatly encouraged the development of national and regional vegetation databases. It fostered the creation of a network facilitating data exchange, research collaborations and assisted emergence of supra-national vegetation revisions and overviews over the last twenty years. The major software tool for database development has been TURBOVEG (Hennekens & Schaminée 2001), now accepted as an international standard for data input, storage, management and retrieval, and installed in over 30 countries in

Europe and beyond (Schaminée & Hennekens 1995). Complementary to TURBOVEG, the JUICE program (Tichý 2002) has added a wide range of analytical tools for data sets that can comprise tens of thousands of relevés.

The most recent study designed to collect estimates of the total number of vegetation plots in Europe (Schaminée et al. 2009) revealed that more than 1.8 million relevés had been already computerised, 75% of which are found in centralised databases of countries or regions. Of all captured relevés 59% are available in TURBOVEG format. Further key steps have now been taken by many EVS members to locate and capture additional plots, and to centralise data storage of such plots. The Global Index of Vegetation-Plot Databases platform (GIVD; Dengler et al. 2011) has been developed to provide a meta-resource of electronic databases whose hosts are willing in principle to share their captured data. The GIVD platform also assisted in revealing gaps in the coverage and/or availability of the vegetation plot data. Another recent initiative – the European Vegetation Archive (EVA; http://euroveg.org/eva-database) – will yield a centralised database of phytosociological relevés to which data from the Czech Republic, The Netherlands, Slovakia, Austria, Germany, Italy, Poland, United Kingdom, and some Nordic and Baltic regions have already been pledged. Each relevé in this Archive will have a unique Global Unified identifier (GUID) and version control will be used to date uploads. One of the first projects within the EVA initiative is the Braun-Blanquet Project, aiming at the compilation and analysis of floristic and geographical information on European vegetation types. The project is dedicated to Josias Braun-Blanquet, whose legacy has been the inspiration for collecting the large sets of vegetation-plot data in Europe (http://www.sci.muni.cz/botany/vegsci/braun_blanquet.php?lang=en).

2.3 Update of crosswalks between EUNIS forest classification and EuroVegChecklist

The crosswalk between the EUNIS habitat types and phytosociological alliances, prepared for the 2012 report on the development of vegetation syntaxa crosswalks to EUNIS habitat classification (Schaminée et al. 2012), was based on a version of the European Vegetation Checklist (EuroVegChecklist) from July 2012. However, EuroVegChecklist was subjected to further modifications after July 2012 until it was ultimately submitted for publication on 30 March 2013 (Mucina et al. 2013). The submitted version of EuroVegChecklist recognizes 101 classes, 279 orders and 1,052 alliances (with 4,067 synonyms). The document comprises 274 pages of text and several electronic appendices, including diagnostic species of classes, glossary of terms, bibliographic appendices, desktop browser and analytical tools. There are 30 authors from 15 countries. Currently this work is under peer-review and its publication is expected in the first half of the year 2014.

In order to work with the most recent version of European vegetation classification in the current project, we revised the 2012 EUNIS-syntaxa crosswalk to match the submitted version of EuroVegChecklist. Ladislav Mucina, the senior author of EuroVegChecklist took part in this revision. This revision reflected the merging of some alliances, the splitting of others, the introduction of new alliances and changes in the delimitation of some alliances that influenced established matches to the EUNIS habitat types. It is probable that some additional changes in the crosswalk will have to be done after the publication of EuroVegChecklist based on recommendations from the referees. However, we expect that the changes between the submitted and published versions will be small and certainly smaller than the changes between July 2012 version and the submitted version.

To ease the work-flow, a tool, called the EuroVegChecklist browser (see Figure 2.2 and Figure 2.3), has been developed in 2012 for linking EUNIS codes to syntaxa codes.

With regard to the definition of forests, the following EUNIS types have been taken into account: G1 (deciduous), G2 (broadleaved evergreen) and G3 (coniferous) and one type from the dunes (B1.7). The syntaxa of the EuroVegChecklist that have been considered were selected on the basis of the crosswalks. The categories G4 and G5 are not dealt with, as these EUNIS types are based on a mixture of concepts. Some of these units correspond to physiognomic types that are unrelated to phytosociological types (e.g. various types of mixed vs. non-mixed forests), whereas other units are complexes of different vegetation types, describing a landscape type containing several habitat types rather than a single habitat type.

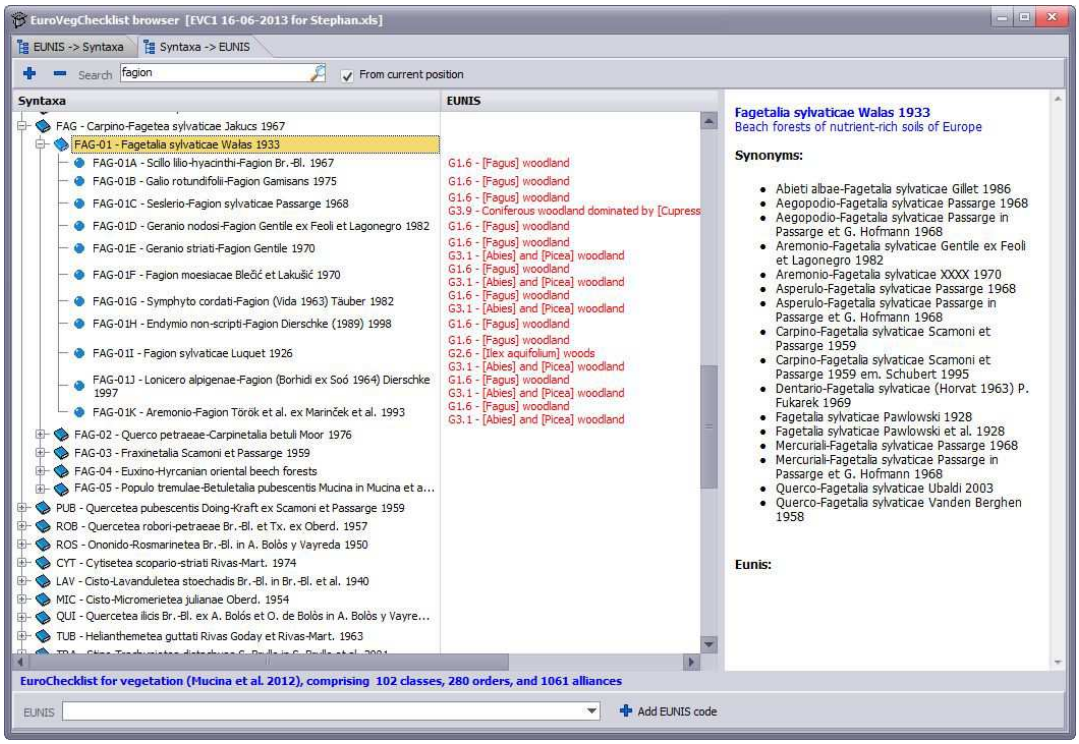

Figure 2.2. EuroVegChecklist (Mucina et al. 2013) browser with tab "Syntaxa -> EUNIS" open, based on the 2013 EuroVegChecklist.

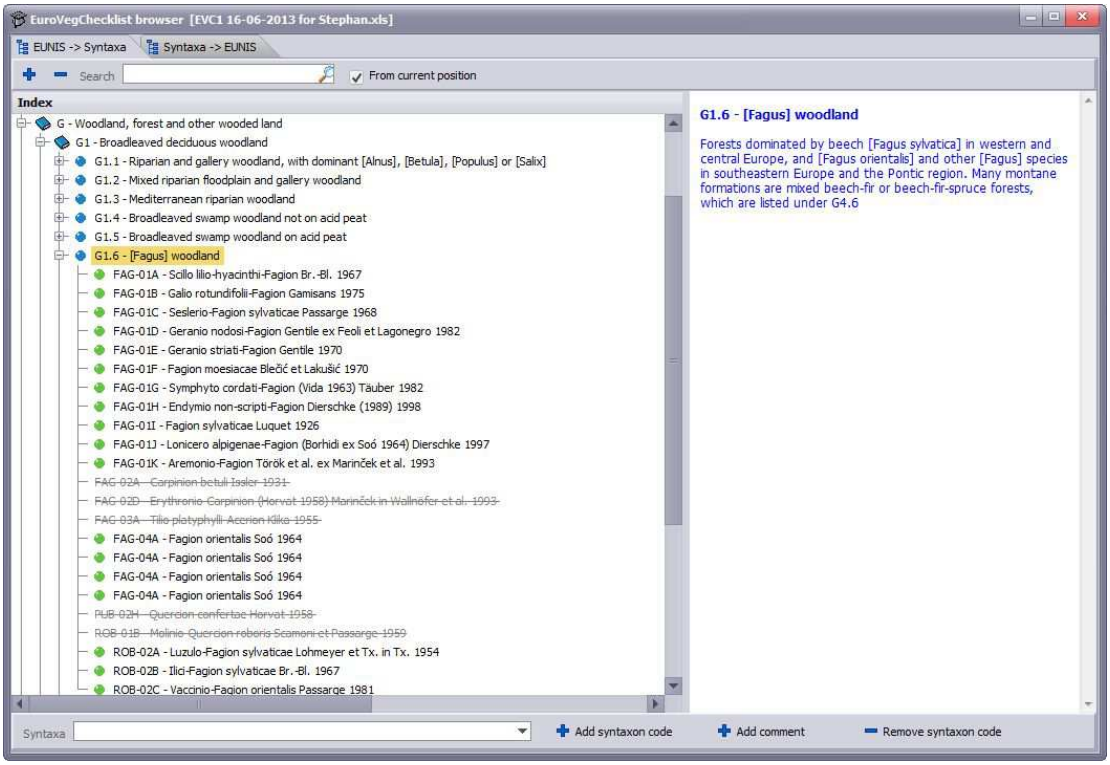

Figure 2.3. EuroVegChecklist browser with tab "EUNIS -> Syntaxa" open, based on the 2013 EuroVegChecklist.

The 2013 EuroVegChecklist was used as the basis for the (revised) crosswalks between European forest syntaxa and EUNIS forest habitat types.

Deliverables:

1. List of EUNIS forest habitat types (B1.7, G1, G2 and G3) and their corresponding syntaxa: APPENDIX A.
2. List of relevant syntaxa (taken from the Crosswalks) and their corresponding EUNIS forest habitat types: APPENDIX B.

2.4 The floristic composition of EUNIS forest habitats at the level of alliances of the 2013 EuroVegChecklist

The floristic composition of the EUNIS forest habitat types has been determined on the basis of the floristic composition of the corresponding phytosociological alliances, according to the revised crosswalk EUNIS-syntaxa (Appendix A). As a basis for the analysis, a database of 670,000 relevés has been compiled, in TURBOVEG format (see Paragraph 2.2), containing datasets from a wide range of data providers throughout Europe (Appendix D).

The procedure consisted of two steps. In the first step, the relevés of regional and national datasets have been classified at the level of alliances of the 2013 EuroVegChecklist. This was done by matching the regional and national classification systems, to which the relevés in the datasets of the data providers were assigned, with the European overview. At present, about 40% (236,000) of the 670,000 relevés could be assigned to one of the alliances accepted in the 2013 EuroVegChecklist, 26% (62,000 relevés) of which belong to forest habitats. In a second step, the assignment to the EUNIS forest habitat types was performed by merging the datasets of the alliances to the corresponding EUNIS type (according to the EUNIS-syntaxa crosswalk).

In the crosswalk, 156 forest alliances of the 2013 EuroVegChecklist have been assigned to one of the 36 EUNIS forest habitat types. At present, 117 of these alliances have been documented with in-situ vegetation-plot data (relevés), i.e. 76%. With regard to the EUNIS forest habitat types, 32 out of 36 have been covered by real data (89%). As mentioned before (Paragraph 2.3), the categories G4 and G5 are not dealt with, as these EUNIS types are based on a

mixture of concepts. The reasons for having no in-situ vegetation data for certain alliances are the following:

(1) Narrow alliance concepts in EuroVegChecklist

For some deciduous forest types, EuroVegChecklist uses a very narrow concept of alliances, which has rarely been used before. Relevés the original databases are not classified to these alliances and correct assignment is difficult.

This concerns the following EurovegChecklist alliances: *Endymio non-scripti-Fagion* Dierschke (1989) 1998, *Lonicero alpigenae-Fagion* (Borhidi ex Soó 1964) Dierschke 1997, *Scillo lilio-hyacinthi-Fagion* Br.-Bl. 1967, *Castaneo-Quercion petraeae* Soó 1964, *Hymenophyllo-Quercion petraeae* Pallas 2000, *Quercion robori-pyrenaicae* (Braun-Blanquet et al. 1956) Rivas-Martínez 1975, *Vaccinio myrtilli-Quercion petraeae* Pallas 1996, and *Pleurozio-Betulion pubescentis* Passarge 1968.

(2) Alliances described from Asia, occurrence in Europe poorly documented

Several alliances were described from Anatolia, Near East or Siberia. They probably occur in Greece or the Southern Ural region, but European data are scarce or non-existing.

This concerns the following EurovegChecklist alliances: *Arbuto andrachnes-Quercion cocciferae* Barbero et Quézel 1979, *Berberido creticae-Juniperion foetidissimae* S. Brullo et al. 2001, *Castaneo-Carpinion betuli* Quézel et al. 1992, *Chamaecytiso hirsuti-Pinion pallasianae* Barbero et Quézel ex Quézel 1992, *Pinion pineae* Feinbrun 1959, *Quercion calliprini* Zohary ex Quézel et al. 1992, *Aconito rubicundi-Abietion sibiricae* Anekhonov et Chytrý 1998, and *Kolerio glaucae-Pinion sylvestris* Ermakov 1999

(3) Alliances from regions with general lack of phytosociological data

Some areas are still not well covered by in-situ vegetation data, like the Boreal zone of Scandinavia and Russia, Ukraine, Caucasus, parts of Balkan, and Cyprus.

This concerns the following EurovegChecklist alliances: *Alno incanae-Salicion pentandrae* Kielland-Lund 1981, *Betulion tortuosae* Doing ex Mucina all. nova, *Calamagrostio canescentis-Piceion abietis* Solomeshch in Solomeshch et Grigorjev 1992, *Cladonio stellaris-Pinion sylvestris* Kielland-Lund ex Ermakov et Morozova 2011, *Empetro-Piceion obovatae* Morozova et al. 2008, *Convallario majalis-Quercion roboris* Shevchyk et Solomakha in Shevchyk et al. 1996, *Corno-Quercion petraeae* Korzhenevsky 1982, *Junipero excelsae-Quercion pubescentis* Jakucs 1960, *Paeonio dauricae-Quercion petraeae* Didukh 1996, *Carpino betuli-Quercion petraeae* Grebenshchikov et al. 1990, *Fraxino orni-Pinion nigrae* Em 1978, *Quercion alnifoliae* Barbero et Quézel 1979, and *Querco-Cedrion libani* Barbero et al. 1974.

(4) Macaronesian and Iberian alliances not recognized in the Spanish SIVIM database

This concerns the following EurovegChecklist alliances: *Juniperion cedri* Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007, *Phoenicion canariensis* Rivas-Mart. et Del Arco in Rivas-Mart. et al. 2011, *Polysticho falcinelli-Ericion arboreae* Rivas-Mart. et al. 2002, and *Rhododendro pontici-Prunion lusitanicae* A.V. Pérez, Galán et Cabezudo in A.V. Pérez et al. 1999

Deliverables:

1. APPENDIX D. Printed EUNIS forest habitats (one sheet for each type). The fact sheets include: (1) name, (2) list of alliances, (3) list of species and their frequencies, including species with a frequency > 10%, (4) qualifier, e.g. origin of data and corresponding EFT type, and (5) possible implications for EUNIS and EFT classifications.

2. Electronically: Constancy column for (1) each alliance – alphabetically – and for (2) each EUNIS type. Matrix with alliance names in the first column, species names in the second column and percentages in the third column. Bryophytes will be included although they were not recorded in all vegetation plots, which implies that their percentage constancy values will be on average underestimated.

3 Review and proposal for improvement of the EUNIS forest habitat classification – Task 2

3.1 Review of EUNIS forest habitat classification

As mentioned above (Par. 2.3), the following EUNIS forest habitat types were considered: G1, G2 and G3 from the main category G, and one habitat type outside this category: B1.7 (Coastal dune woods). Through preparing the crosswalks, we could propose two types of recommendations for improving the EUNIS forest habitat classification, one dealing with the content of the habitat types and one dealing with their naming.

Content: By comparing the existing EUNIS classification with the phytosociological content of the assigned syntaxa, we found strong ground for revising the EUNIS types G1.6, G1.9, G3.1, G3.4, G3.5 and G.3.9.

Proposal for improvement of the EUNIS types:

EUNIS G1.6 Fagus woodland. The classification of the wide diversity of European beech forests has long been a challenge, division among them being made sometimes on soil reaction/trophic state, on altitudinal range or on geographical patterns of occurrence. At present, all such beech woods are included within a single G1.6 EUNIS type which is equivalent in our crosswalk to 15 alliances. On the basis of soil reaction, we have proposed making a separation into G1.6' Fagus woodland (with 12 alliances) on non-acid soils and G1.6'' Fagus woodland on acid soils (with 3 alliances).

EUNIS G1.9 Non-riverine woodland with Betula, Populus tremula or Sorbus aucuparia includes a wide diversity of birch and aspen woodlands which we have recommended splitting into two based on altitudinal and geographical characteristics of the constituent alliances: G1.9' Mountain Betula and Populus tremula woodland on mineral soils (with 7 alliances) and G1.9'' Lowland Continental Betula and Populus tremula woodland on mineral soils (with 2 alliances).

EUNIS G3.1 Abies and Picea woodland all fir and spruce forests and, on the basis of the canopy dominants and geographical distribution among the constituent 16 alliances, we have recommended a split into 3 sub-groups: G3.1' Temperate mountain Picea woodland (with 5 alliances), G3.1'' Temperate mountain Abies woodland (9 alliances) and G3.1''' Mediterranean mountain Abies woodland (3 alliances).

We have recommended combining *EUNIS G3.4 Pinus sylvestris woodland south of the taiga and G3.5 Pinus nigra woodland* and then splitting this combined group on the more justifiable basis of climatic and geographic affiliations among the 25 constituent alliances: G3.4' Temperate continental Pinus sylvestris woodland (6 alliances), G3.4'' Temperate and Submediterranean montane Pinus sylvestris-Pinus nigra woodland (9 alliances) and 3.4''' Mediterranean-montane Pinus sylvestris-nigra woodland (6 alliances).

EUNIS G3.9 Coniferous woodland dominated by Cupressaceae or Taxaceae comprises 11 alliances, differences among which prompt us to suggest a split based on phytogeographical affiliations among the constituent alliances: G3.9' Taxus baccata woodland (with 1 alliances), G3.9'' Mediterranean Cupressaceae woodland (5 alliances) and G3.9''' Macaronesian Juniperus woodland (5 alliances).

Naming: With regard to the names of the EUNIS forest habitat types we could derive a set of general recommedations, which we have applied to the existing classification. Where relevant, we have clarified our suggestions by one or more examples.

General recomendation 1: Adopt brief and clear names for the habitat types.

General recommendation 2: Where possible ensure that the names are recognizable to users of the EFT classification.

General recommendation 3: Names within a group of related forest types should be mutually exclusive with regard to for example biogeographic zone, soil conditions and dominant species. Example: G1.1 (Broadleaved deciduous woodland) and G1.2 (Mixed riparian floodplain and gallery woodland) are meant only for the temperate and boreal zone and are defined against G1.3 (Mediterranean riparian woodland) for the mediterranean and Macaronesian zone. Example: G1.4 (Broadleaved swamp woodland not on acid peat) has to be changed, because the original name would imply that it also could occur on mineral soils which is not the case and for which another forest habitat type is proposed (G1.B, Non-riverine [Alnus] woodland).

General recommendation 4: Do not use square brackets to indicate scientific names. If included, scientific taxon names should be in italics.

General recommendation 5: Use a standardized naming. Example: leave out the word 'dominant' in G1.8 (Acidophilous [Quercus]-dominated woodland), as it is not used at other places. Highly artificial is vague and it is better to replace it by 'non site-specific' as used in the EFT classificiation. Another examle: it is better to use the term 'temperate' in stead of 'nemoral'.

General recommendation 6: Geographic epithets in the names must be accurate. Example: the epithet Canary Island in G2.7 has to be changed into Macaronesian, as this habitat type also occurs on Madeira.

General recommendation 7: Names should not confuse climatic, geographic or biogeograhic meanings, e.g. avoid 'alpine'. Example: G3.2, where subalpine would be the correct term.

3.2 Proposal for improved list of EUNIS forest habitat types

Applying these recommendation with regard to content and naming would result in the following updated list of EUNIS forest habitat types (habitat types with changes in names are indicated with an *; in such case, the existing name is put within brackets behind the proposed new name):

► B1.7 Coastal dune woodland* [Coastal dune woods]

► G1.1 Temperate and boreal softwood riparian woodland* [Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]]

► G1.2 Temperate and boreal hardwood riparian woodland* [Mixed riparian floodplain and gallery woodland]

► G1.3 Mediterranean and Macaronesian riparian woodland* [Mediterranean riparian woodland]

► G1.4 Broadleaved swamp woodland on non-acid peat* [Broadleaved swamp woodland not on acid peat]

► G1.5 Broadleaved swamp woodland on acid peat* [Broadleaved swamp woodland on acid peat]

► G1.6 [Fagus] woodland could be divided into two types, because of the high variation within the overall type and the possibility to make a clear division:

►► G1.6' Fagus woodland on non-acid soils

►► G1.6'' Fagus woodland on acid soils

► G1.7 Thermophilous deciduous woodland

► G1.8 Acidophilous Quercus woodland* [Acidophilous [Quercus]-dominated woodland]

► G1.9 Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia] has to be divided into two types:

►► G1.9’ Mountain Betula and Populus tremula woodlands on mineral soils

►► G1.9’’ Lowland continental Betula and Populus tremula woodlands on mineral soil

► G1.A Mesotrophic and eutrophic deciduous woodland, not dominated by Fagus* [Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland]

► G1.B Non-riverine Alnus woodland on mineral soil* [Non-riverine [Alnus] woodland]

► G1.C Broadleaved deciduous plantations of non site-native trees* [Highly artificial broadleaved deciduous forestry plantations]

► G1.D Fruit and nut tree orchards is not a woodland and should be removed (it could go into EUNIS group I)

► G2.1 Mediterranean evergreen Quercus woodland* [Mediterranean evergreen [Quercus] woodland]

► G2.2 Mainland lauriphyllous woodland* [Eurasian continental sclerophyllous woodland]

► G2.3 Macaronesian lauriphyllous woodland* [Macaronesian [Laurus] woodland]

► G2.4 Olea oleaster-Ceratonia siliqua woodland* [Olea europaea] - [Ceratonia siliqua] woodland]

► G2.5 Phoenix groves* [[Phoenix] groves]

► G2.6 Ilex aquifolium woodland* [[Ilex aquifolium] woods]

► G2.7 Macaronesian heathy woodland* [Canary Island heath woodland]

► G2.8 Broadleaved evergreen plantations of non site-native trees* [Highly artificial broadleaved evergreen forestry plantations]

► G2.9 Evergreen orchards and groves is not a woodland and should be removed (it could go into EUNIS group I)

► G3.1 [Abies] and [Picea] woodland has to be divided into three types (according to dominant species and geographic distribution):

►► G3.1’ Temperate mountain Picea woodland

►► G3.1’’ Temperate mountain Abies woodland

►► G3.1’’’ Mediterranean mountain Abies woodland

► G3.2 Temperate subalpine Larix-Pinus woodland* [Alpine [Larix] - [Pinus cembra] woodland]

[G3.3 [Pinus uncinata] woodland should be merged into G3.2 [Alpine [Larix] - [Pinus cembra] woodland] (this category corresponds to the same phytosociological units, with Pinus species as the usual dominant)]

► G3.4 [Pinus sylvestris] woodland south of the taiga has to be divided into three types:

►► G3.4’ Temperate continental Pinus sylvestris woodland

►► G3.4’’ Temperate and submediterranean montane Pinus sylvestris-nigra woodland

►► G3.4’’’ Mediterranean montane Pinus sylvestris-nigra woodland

[G3.5 [Pinus nigra] woodland should to be merged into the G3.4’’ and G3.4’’’ types]

► G3.6 Mediterranean and Balkan subalpine Pinus heldreichii-peucis woodland* [balpine mediterranean [Pinus] woodland]

► G3.7 Mediterranean lowland to submontane Pinus woodland* [Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])]

► G3.8 Pinus canariensis woodland* [Canary Island [Pinus canariensis] woodland]

► G3.9 Coniferous woodland dominated by [Cupressaceae] or [Taxaceae] should be divided into two types: Taxus baccata woodland and Juniperus-Cupressus woodland and further into mainland and Macaronesia.

►► G3.9’ Taxus baccata woodland

►► G3.9’’ Mediterranean woodland

►► G3.9’’’ Macaronesian Juniperus woodland

► G3.A Picea taiga woodland* [[Picea] taiga woodland]

► G3.B Pinus sylvestris taiga woodland* [[Pinus] taiga woodland]

► G3.C Larix taiga woodland* [[Larix] taiga woodland]

► G3.D Boreal bog conifer woodland* [Boreal bog conifer woodland]

► G3.E Temperate bog conifer woodland* [Nemoral bog conifer woodland]

► G.3.F Conifer plantations of non site-native trees* [Highly artificial coniferous plantations]

4 Reviewing the crosswalk of EUNIS and European Forest Types – Task 3a

4.1 Background

The classification of European Forest Types (hereafter EFT, EEA 2006) was produced to provide the Ministerial Conference on the Protection of Forests in Europe (hereafter MCPFE) with a user-friendly system within which indicators of sustainable forest management could be reported. For this purpose, both EUNIS (Davies et al. 2004) and the Diversity of European Vegetation with an overview of phytosociological alliances (Rodwell et al. 2002) were considered inappropriate: both were thought to have an unfeasible number of types for MCPFE reporting and the latter to represent a phytosociological approach not readily accessible to MCPFE end-users.

The EFT covered forested land as defined by the FAO (2004) and was derived from an earlier classification for the Biodiversity Assessment in Europe project (BEAR, Larsson 2001). It originally proposed a typology of 14 classes sub-divided into 78 types (EEA 2006). A second edition (EEA 2007) changed some names and descriptions and a revision by UNECE/FAO (2010) added 3 further new types with a split of one original type into two.

The original EFT classification included a cross-reference of the 78 types to EUNIS habitats at level 3 (Davies et al. 2004) and also to the Annex I habitats of the Habitats Directive (92/43/EEC). However, the correspondence to EUNIS was incomplete and not provided in tabular form. A subsequent report from the European Topic Centre on Biological Diversity (hereafter ETC-BD, Evans 2013) reviewed the EUNIS links, including the types added in UNECE/FAO (2010), and presented these as EFT x EUNIS and EUNIS x EFT tabular crosswalks.

4.2 Reviewing the EFT x EUNIS links

It is these crosswalks, which we have checked and found completely accurate, as well as the text of the EFT reports (EEA 2006, 2007), which have been used as the basis for our own review of the EFT classification and its relationships to EUNIS, in particular the implications for EFT of our proposed changes to the EUNIS classification of forests. Of course, our own review of the EUNIS forest classification relates only to EUNIS G1, G2 & G3 (and B1.7), whereas the EUNIS x EFT links extend some way into the mixed forests of

EUNIS G4, though they likewise exclude the markedly anthropogenic woodlands and forestry plantations of EUNIS G5.

Appendix C provides a tabular crosswalk between the existing EUNIS types and the EFT. It can be seen there that 24/50 of the EUNIS forest types linked to EFT have a 1:1 relationship and 17 of these links (34% of the total) are exclusive. With the development of a crosswalk between EUNIS forest types and the alliances of the EuroVegChecklist (Appendices A & B), it is possible for these exclusive links to make explicit those alliances equivalent to EFT forest types, as for example in Figure 4.1.

EUNIS G2.1 - Mediterranean evergreen [Quercus] woodland
EFT 9.1 Mediterranean evergreen oak forest
* QUI-02A - Quercion calliprini Zohary ex Quézel et al. 1992
* QUI-02D - Quercion alnifoliae Barbero et Quézel 1979
* QUI-03A - Quercion ilicis Br.-Bl. ex Molinier 1934
* QUI-03B - Querco rotundifoliae-Oleion sylvestris Barbero et al. in Rivas-Mart. et al. 1986
* QUI-03C - Quercion broteroi Br.-Bl. et al. 1956 corr. Rivas-Mart. 1972
* QUI-03D - Fraxino orni-Quercion ilicis Biondi et al. ex Biondi, Casavecchia et Gigante 2013
* QUI-03E - Cyclamini cretici-Quercion ilicis Barbero et Quézel ex Quézel et al. 1992
* QUI-03F - Arbuto andrachnes-Quercion cocciferae Barbero et Quézel 1979
* QUI-03G - Erico-Quercion ilicis S. Brullo et al. 1977

Figure 4.1 Alliances equivalent to an EFT type with an exclusive link to EUNIS

The remaining EUNIS types have 'one to several' or 'one to many' EFT links, either because EFT makes distinctions on canopy composition (e.g. within equivalents of G1.7 Thermophilous deciduous woodland, and G1.A Meso- and eutrophic deciduous woodland) or on a climatic basis (e.g. within G1.6 *Fagus* woodland) or both (within G3.1, G3.4 & G3.5 *Abies*, *Picea* & *Pinus* woodlands and G3.9 Coniferous woodland dominated by Cupressaceae or Taxaceae). Many of these distinctions in EFT make sense when referred to the alliances that, within our crosswalk, compose the EUNIS types. Appendix D lists both the alliances and the EFT types which are equivalent to each EUNIS forest type.

4.3 Implications of the proposed changes in EUNIS for EFT links

Furthermore, our own proposals for the revision of the EUNIS forest classification, based entirely on the phytosociological relationships of the units, bring some further clarity to EUNIS x EFT links. These changes and the implications for EFT are shown in Appendix C.

Our proposed divisions among the EUNIS G1.9 Non-riverine woodland with Betula, Populus tremula or Sorbus aucuparia, of EUNIS G3.1 Abies and Picea woodland and of EUNIS G3.9 Coniferous woodland dominated by Cupressaceae or Taxaceae all give a clearer fit with EFT. Our combination and resplit of EUNIS G3.4 Pinus sylvestris woodland south of the taiga and G3.5 Pinus nigra woodland also produces somewhat cleaner equivalence with the EFT. Our inclusion of EUNIS B1.7 Coastal dune woods finds clear phytosociological links with 9 alliances in the crosswalk and is equivalent to EFT 2.7 Atlantic maritime pine forest, though this type obviously includes only part of what can be assigned to the EUNIS category.

Our proposed division of EUNIS G1.6 Fagus woodland cross-cuts the distinctions made in the EFT which are based first on altitudinal range (into EFT 6 Beech forest and EFT 7 Mountainous beech forest) but many of the numerous ultimate divisions within both of these units can be related to alliances which are included in the EuroVegChecklist.

4.4 Conclusions

Our proposed revisions to the EUNIS forest classification produce a clearer equivalence with EFT. Furthermore, our development of a crosswalk between EUNIS forests and the forest alliances of the EuroVegChecklist should enable uncertain relationships with EFT to be resolved through crosswalking. Such clarification will have both a scientific and political benefit in bringing together different user communities, each with their own interests in forest classification and applications for the delivery of forest-related policies across Europe. Possible further developments are included in the next chapter.

5 Steps towards assessment of forest ecosystems – Task 3b

By providing the various European forest classification systems with the floristic composition of the individual types (using the available vegetation databases and published sources), we can strengthen the scientific basis for European nature and landscape policy in general and, more particularly, make some progress towards improved assessment of forest ecosystems. Grounding the EUNIS forest habitat classification with in-situ vegetation plot data can help to characterize the existing units more precisely in terms of their floristic, geographic, physiognomic and environmental parameters. Clearer links between EUNIS forest types and the alliances of the EuroVegChecklist provide further scientific substantiation of the EUNIS habitat classification in terms which give access to extensive data, literature and expert knowledge across the whole of Europe.

To illustrate how further steps might be taken to apply the results of this report for the assessment of European forests and trends in their quality, and to establish links with earth observations, we offer four lines of development: (1) Developing relationships with the EFT, (2) Ecosystem and habitat mapping for European forests, (3) Integration with the Map of the Natural Vegetation of Europe, (4) Applying Red List assessment of European forest types, (5) Developing indicator systems for European forests.

5.1 Developing relationships with the EFT

With the development of a revised classification of EUNIS forest types and a crosswalk of these to the EuroVegChecklist alliances, it becomes possible to realise closer integration of forest classifications across Europe. Populating of alliances with vegetation plot data could then be conceived within the frame of the EFT. This could deliver definition of forest types in phytosociological terms and higher quality distribution maps. With parameterisation of alliances in terms of species and environmental factors, it would also become possible to better define the EFT 'key factors' on which the character and functioning of forests depend. The increasing availability of evaluation data for EUNIS types through the Red Data List for European Habitats will also allow a clearer appraisal of indicators of sustainability for EFT forest types.

5.2 Ecosystem and habitat mapping for European forests

European in-situ vegetation data are a source for not only determining the floristic composition of habitat types, but they can also be an excellent repository for ecosystem or habitat distribution mapping and modelling. In conjunction with earth observations, they can help interpret remote-sensing forest imagery.

In Figure 5.1 the distribution of Beech (*Fagus sylvatica*) is shown, the map being based on recorded occurrences within 62,062 phytosociological plots. Although the distribution of records seems to cover a large part of Europe, some areas are clearly under-represented or not represented at all among the relevé data, like southern Scandinavia and northern Spain where the tree is known to occur. However, when applying a species distribution model (in this case using MaxEnt software, Philips et al. 2004), Beech is shown as likely to be present in relevant parts of Scandinavia and Spain (see Figure 5.2). The distribution model of the Beech is based on bioclimatic variables of the Worldclim model (*http://www.worldclim.org/bioclim*). The predictor which explains the largest portion of the distribution in this case is the Temperature Seasonality (difference between the monthly maximum and minimum temperatures) and to a lesser extent the maximum temperature of the warmest month.

Figure 5.1 Distribution of phytosociological relevés with Fagus sylvatica*.*

Although this kind of modelling on a European scale could be carried out for many species and habitats, there is first a need for more geo-referenced data of actual occurrences, especially from areas at present under-represented. And further, there should be a fully harmonised taxonomic reference list, because data come from many different national sources which often use different concepts for taxa considerably more complex than Beech. If the mapping is based on vegetation-plot databases, its strength is especially in mapping habitat (vegetation, ecosystem) types, because vegetation-plot data are unique source of information in this respect. Maps similar to the map of beech distribution can be produced for forest alliances or EUNIS forest habitat types. If the relationships to EFTs were established (see chapter 5.1), such maps could be also produced for EFTs. In any case, the use of these tools is widely implemented in biodiversity information systems (e.g. GBIFbif) and it could be also applied to vegetation-plot datasets to assess the distribution of habitat types.

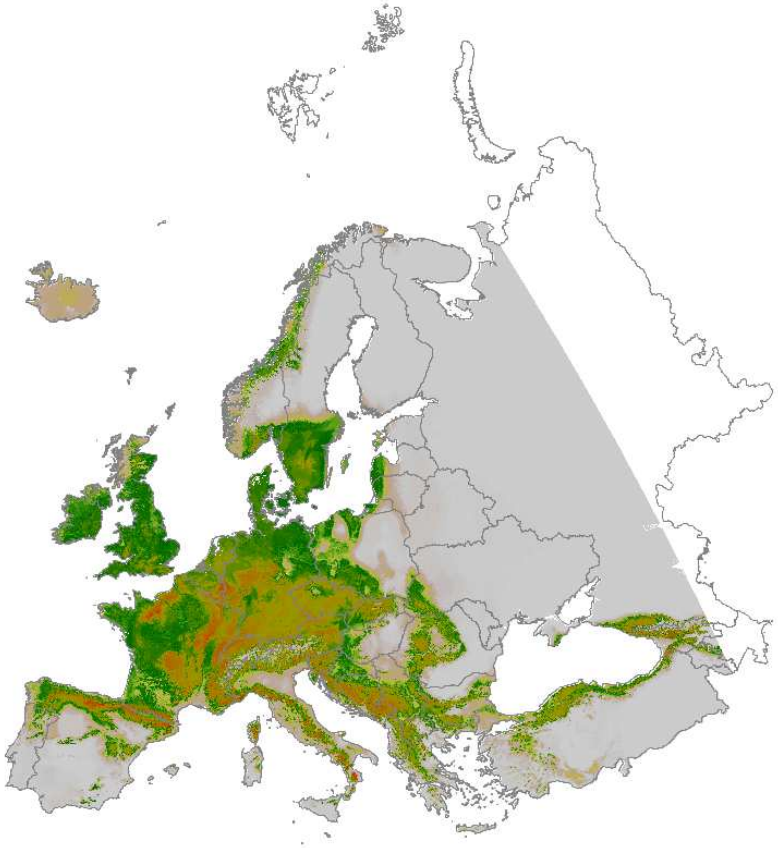

Figure 5.2 Probability map of Fagus sylvatica *based on a distribution model (Maxent, colours varying from grey, through green to red, indicating an increasing probability).*

For predictive mapping of habitats on a large scale, climatic and edaphic predictors are most often used. However, these predictors sometimes do not take into account biogeographical patterns that are unrelated to these predictors. This problem can be solved by incorporating units of potential natural vegetation (PNV), a concept developed by Tüxen (1956). Various PNV maps that were constructed at the national level formed the basis for and culminated in The Map of the Natural Vegetation of Europe (Bohn et al. 2000-2004). More than 100 geobotanists from 31 European countries cooperated in this project, in producing the map itself, developing the legend and composing the explanatory text. Applications of the Map for scientific and policy purposes are multifarious (Bohn et al. 2005) and include its value for the delivery of the Natura 2000 network (Evans 2005). The categories of the EFT have also been cross-linked with high-level mapping units of the Map (EEA 2006, 2007). The Map is available at a scale of 1:2,5 million, both in hard copy as 9 sheets and as an interactive CDrom. The legend is built-up of different hierarchical levels, comprising 19 major formations and 700 ultimate mapping units. Each mapping unit, representing specific landscape types, is documented by a general description and information on composition and structure of the main natural vegetation types, on distribution, ecology, land use, landscape pattern, actual plant communities, and nature conservation. The background data from each country list the local equivalents for each mapping unit and replacement vegetation under different management, often classified as phytosociological syntaxa (eg. Rodwell & Winstanley 1995).

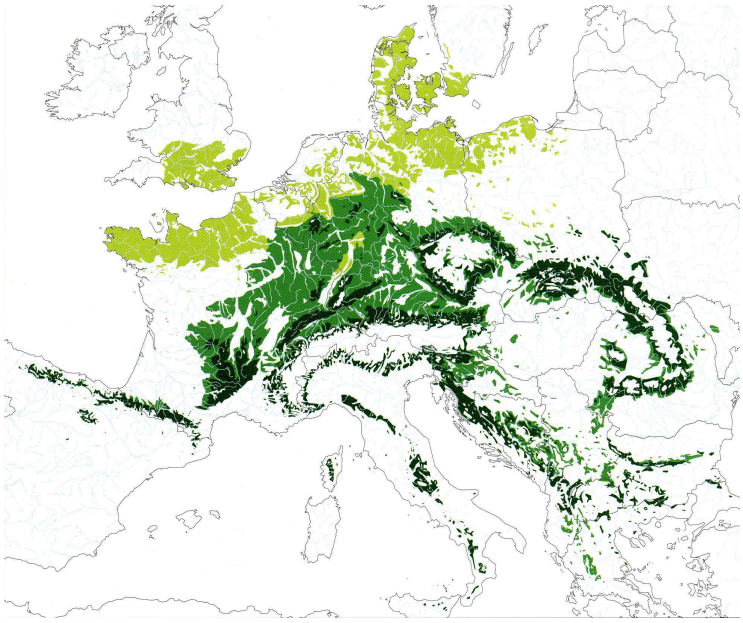

Figure 5.3 Lowland (light green), colline-submontane (mid green) and montane-altimontane/subalpine (dark green) beech forests from the Map of the Natural Vegetation of Europe (© Bundesamt für Naturschutz 1999).

For example, at the simplest level, Figure 5.1 shows the natural distribution of beech forests (EUNIS G1.6 and EFT 6 & 7) across Europe, aggregated and scaled down from 1:2.5M. Such a map should be compared with Figures 5.2 and 5.3 above.

5.3 Applying Red List assessment of European forest types

Key questions for Red List assessment of assemblages of species or their habitats are what typology should be used to provide the units of assessment and over what scale the assessment should be conducted, whether by country or regionally. So far, such Red List assessments have used either phytosociological frameworks of plant associations or alliances, classifications of habitats of some kind or an ecosystem typology. The first approach has been the most frequent across Europe, both within and beyond the EU, with numerous published volumes and unpublished reports. Projects using the habitat approach have been less numerous but have gained purchase on EU environmental policy frames through cross-reference to CORINE biotopes or EUNIS habitats. An ecosystem approach, being at present promoted by IUCN, has gained most support outside Europe where landscape variation is of continental scale, less complicated by cultural interaction and where the tradition of scientific perception is more attuned to large-scale landscape patterns and statutory responsibilities.

A feasibility study on Red List Assessment in Europe for DG Environment, in which two of the present authors (John Rodwell & Joop Schaminée) have been involved (Janssen et al. 2012), suggested that the mid-scale of habitats is the most practicable typology for Europe and that the EUNIS Habitat Classification has the great advantage of providing a single framework for the marine as well as the terrestrial and freshwater realms. It is moreover fully compatible with the typology of the MAES (Mapping and Assessment of Ecosystems and their Services) refinement of the EU 2010 Biodiversity Baseline.

The feasibility study proposed using EUNIS at level 3 as a basis for Red List assessment of terrestrial and freshwater habitats with modifications where necessary to units that were more complex or cumbersome. This present revision of the EUNIS forest classification provides a demonstration of how such simplification could proceed. An unequivocal crosswalk between EUNIS-level 3 and phytosociological syntaxa would thus enable the EUNIS typology to be interpreted locally by an extensive international community of practitioners already skilled in the recognition of species assemblages in their own territories and often familiar with Conservation Status Assessment (Article 17 reporting). Such an expert network was included within the bid for implementing a Red List assessment of European habitats based on the methodology proposed in the feasibility study, a contract which has just been awarded to Alterra in which the present authors are key participants.

Agreed Red List criteria and thresholds will enable separate country-scale evaluations for different alliances to be more readily equilibrated and combined within EUNIS-level 3 habitats that extend across whole biogeographical regions or which occur internationally. This would also have the virtue of reinforcing concern for the status and condition of habitats outside the frame of Annex I of the Habitats Directive. More immediately, this programme will deliver a revision of the EUNIS habitat classification and a Fact Sheet whose categories can be integrated in a developing parameter-frame for EUNIS habitats.

5.4 Developing indicator systems for European forests

Based on data collected in vegetation-plot databases, formal definitions of forest vegetation types (syntaxa) and EUNIS habitat types (and optionally also forest types of the EFT classification) can be developed, based on indicator species and groups of indicator species. Such indicator systems would be useful both for the work with vegetation-plot databases and for field survey and monitoring. This work can be based on the experience from developing an expert system for identification of vegetation types in the project Vegetation of the Czech Republic (Chytrý 2007-2013) and further methodological developments since then. In the context of databases, unequivocal formal definitions of vegetation/habitat types would allow searching across different databases of vegetation plots and identifying those belonging to specific vegetation or habitat types in a consistent way. This would enable fast assembling and re-assembling of vegetation-plot data sets in any time in the future, when new kinds of characterization of individual vegetation/habitat types are needed, or the existing characterizations are to be updated after adding new data to the databases. In the context of field survey and monitoring, species-based indicator systems would provide simple tools for identification of vegetation/habitat types by field survey teams.

6 References

Braun-Blanquet, J. (1928). *Pflanzensoziologie. Grundzüge der Vegetationskunde*. Springer-Verlag, Berlin.

Chytrý, M. (2007, ed.). *Vegetace České republiky 1. Travinná a keříčková vegetace (Vegetation of the Czech Republic 1. Grassland and heathland vegetation).* Academia, Praha.

Chytrý, M. (2009, ed.). *Vegetace České republiky 2. Ruderální, plevelová, skalní a suťová vegetace. Vegetation of the Czech Republic 2.Ruderal, weed, rock and scree vegetation.* Academia, Praha.

Chytrý, M. (2011, ed.). *Vegetace České republiky 3. Vodní a mokřadní vegetace. Vegetation of the Czech Republic 3. Aquatic and wetland vegetation.* Academia, Praha.

Chytrý, M. (2013, ed.). *Vegetace České republiky 4. Lesní a křovinná vegetace. Vegetation of the Czech Republic 4. Forest and scrub vegetation.* Academia, Praha.

Chytrý, M. & Otýpková, Z. (2003). Plot sizes used for phytosociological sampling of European vegetation. *Journal of Vegetation Science* 14: 563-570.

Davies, C & Moss, D. (1999). *EUNIS Habitst Classification. Final report to the European Topic Centre on Nature Conservation, European Environment Agency*. Institute of Terrestrial Ecology, Huntingdon.

Davies C. E., Moss, D. & Hill, M.O. (2004). EUNIS Habitat Classification Revised 2004. Available from *http://eunis.eea.europa.eu/upload/EUNIS2004_ report.pdf*.

Dengler, J., Jansen F., Glöckler F., Peet, R.K., De Cáceres, M., Chytrý, M., Ewald, J., Oldeland, J., Lopez-Gonzalez, G., Finckh, M., Mucina, L., Rodwell, J.S., Schaminée, J.H.J. & Spencer, N. (2011): The Global Index of Vegetation-Plot Databases (GIVD): a new resource for vegetation science. *Journal of Vegetation Science* 22: 582–597.

Devillers, P. & Devillers-Terschuren, L. (1996). A classification of Palaearctic habitats. Nature & Environment No 78. Council of Europe, Strasbourg.

EEA (2006). *European forest types-categories and types for sustainable forest management reporting and policy*. European Environment Agency Technical Report 9/2006

EEA (2007). *European forest types-categories and types for sustainable forest management reporting and policy (2nd edition)*. European Environment Agency Technical Report 9/2006.

Evans, D. (2013). European Forest Types and the EUNIS habitat classification. Report from the European Topic Centre on Biological Diversity to the European Environment Agency.

Ewald, J. (2001). Der Beitrag pflanzensoziologischer Datenbaken zur vegetations-ökologischen Forschung. *Ber. Reinhold-Tüxen-Ges*. 13: 53-69.

FAO (2004). Global forest resources assessment update 2005 - terms and definitions. FAO, Rome.

Hennekens, S.M. & Schaminée, J.H.J. (2001). TURBOVEG, a comprehensive data base management system for vegetation data. *Journal of Vegetation Science* 12: 589–591.

Larsson, T.B. (2001). Biodiversity Evaluation Tools for European forests. *Ecological Bulletins* 50: 1-237.

Mucina, L., Grabherr, G., Ellmauer, T. & Wallnöfer, S. (1993, eds.). *Die Pflanzengesellschaften Österreichs. Teil I–III.* Gustav Fischer, Jena.

Mucina, L., Bültmann, H., Dierßen, K., Theurillat, J.-P., Dengler, J., Čarni, A., Šumberová, K., Raus, T., Di Pietro, R., Gavilán García, R., Chytrý, M., Iakushenko, D., Schaminée, J.H.J., Bergmeier, E., Santos Guerra, A., Daniëls, F.J.A., Ermakov, N., Valachovič, M., Pignatti, S., Rodwell, J.S., Pallas, J., Capelo, J., Weber, H.E., Lysenko, T., Solomeshch, A., Dimopoulos, P., Aguiar, C., Freitag, H., Hennekens, S.M. & Tichý, L. (2013, submitted). Vegetation of Europe: Hierarchical floristic classification system of plant, lichen, and algal communities. *Applied Vegetation Science*.

Mueller-Dombois, D. & Ellenberg, H. (1974). Aims and methods of Vegetation Ecology. John Wiley & Sons, New York.

Philips S.J., Dudik, M. & Schapire, R.E. (2004). A Maximum Entropy Approach to Species Distribution Modelling. In: *Proceedings of the Twenty-First International Conference on Machine Learning*, 655-662.

Rodwell, J.S. (1990, ed.). *British plant communities. Volume 1.Woodlands and scrub*. Cambridge University Press, Cambridge.

Rodwell, J.S. (1991, ed.). *British plant communities. Volume 2.Mires and heaths*. Cambridge University Press, Cambridge.

Rodwell, J.S. (1992, ed.). *British plant communities. Volume 3. Grasslands and montane communities*. Cambridge University Press, Cambridge.

Rodwell, J.S. (1995, ed.). *British plant communities. Volume 4. Aquatic communities, swamps and tall-herb fens*. Cambridge University Press, Cambridge.

Rodwell, J.S. (2000, ed.). *British plant communities. Volume 5. Maritime communities and vegetation of open habitats*. Cambridge University Press, Cambridge.

Rodwell, J.S., Schaminée, J.H.J., Mucina, L., Pignatti, S., Dring, J. & Moss, D. (1998). *The Scientific Basis of the EUNIS Habitat Classification. Report to the European Topic Centre on Nature Conservation*. Unit of Vegetation Science, Lancaster.

Rodwell, J. S., Schaminée, J.H.J., Mucina, L., Pignatti, S., Dring, J. & Moss, D. (2002). *The Diversity of European Vegetation, An overview of phytosociological alliances and their relationships to EUNIS habitats.* National Reference Centre for Agriculture, Nature & Fisheries, Wageningen.

Schaminée, J.H.J., Hennekens, S.M. & Ozinga, W.A. (2007). Use of the ecological information system SynBioSys for the analysis of large databases. *Journal of Vegetation Science* 18: 463-470.

Schaminée, J.H.J., Chytrý, M, Hennekens, S.M., Mucina, L. Rodwell, J.S. & Tichý, L. (2013). *Development of vegetation syntaxa crosswalks to EUNIS habitat classification and related data sets*. Report for the European Environment Agency, Copenhagen.

Schaminée J. H. J., Hennekens S. M., Chytrý M. & Rodwell, J. S. (2009). Vegetation-plot data and databases in Europe: an overview. *Preslia* 81: 173–185.

Schaminée, J.H.J., Janssen, J.A.M., Hennekens, S.M. & Ozinga, W.A. (2011). Large vegetation databases and information systems: new instruments for ecological research, nature conservation and policy making. *Plant Biosystems* 145: 85-90.

Schaminée, J.H.J., Stortelder, A.H.F. & Westhoff, V. (1995). *De Vegetatie van Nederland 1. Inleiding tot de plantensociologie: grondslagen, methoden en toepassingen*. Opulus, Uppsala/Leiden.

Schaminée, J.H.J., Weeda, E.J. & Westhoff, V. (1995). *De Vegetatie van Nederland 2. Plantengemeenschappen van wateren, moerassen en natte heiden*. Opulus, Uppsala/Leiden.

Schaminée, J.H.J., Stortelder, A.H.F. & Weeda, E.J. (1996). *De Vegetatie van Nederland 3. Plantengemeenschappen van graslanden zomen en droge heiden*. Opulus, Uppsala/Leiden.

Schaminée, J.H.J., Weeda, E.J. & Westhoff, V. (1998). *De Vegetatie van Nederland 4. Plantengemeenschappen van de kust en van binnenlandse pioniermilieus*. Opulus, Uppsala/Leiden.

Smart, S.M., Clarke, R.T., Van de Poll, H.M., Robertson E.J., Shield E.R., Bunce, R.G.H. & Maskell, L.C. (2003). National-scale vegetation change across Britain; an analysis of sample-based surveillance data from the Countryside Surveys of 1990 and 1998. *Journal of Environmental Management* 67: 239–254.

Stortelder, A.H.F., Schaminée, J.H.J. & Hommel, P.W.F.M. (1999). *De Vegetatie van Nederland 5. Plantengemeenschappen van ruigten, struwelen en bossen*. Opulus, Uppsala/Leiden.

Tichý, L. (2002). JUICE, software for vegetation classification. *Journal of Vegetation Science* 13: 451–453.

UNECE/FAO (2010). *Annex to Enquiry State of Forests and Sustainable Forest Management in Europe 2011. New European Forest Types*. *Complementary documentation*. http://www.unece.org/fileadmin/DAM/timber/-publications/european-forest-type.pdf.

Valachovič, M., Oťaheľová, H., Stanová, V. & Maglocký, Š. (1995). *Rastlinné spoločenstvá Slovenska 1. Pionierska vegetácia.* Veda, Bratislava.

Appendix A: An updated Crosswalk EUNIS forest habitat types (B1.7, G1, G2, G3) to the 2013 EuroVegChecklist syntaxa

B - Coastal habitats
- B1 - Coastal dunes and sandy shores
  - B1.7 - Coastal dune woods
    - * FAG-02A - Carpinion betuli Issler 1931
    - * FAG-05D - Ligustro vulgaris-Betulion pubescentis Ge´hu 2006
    - * PIC-02A - Dicrano-Pinion (Libbert 1933) W. Matuszkiewicz 1962
    - * POP-02A - Alnion incanae Pawlowski et al. 1928
    - * QUI-01A - Oleo-Ceratonion siliquae Br.-Bl. ex Guinochet et Drouineau 1944
    - * QUI-01G - Juniperon phoeniceae-Pinon acutisquamae A.V. Pérez et Cabezudo in A.V. Pérez et al. 1988 corr. Rivas-Mart. et al. 2002 nom. invers. propos.
    - * QUI-02E - Pinion pineae Feinbrun 1959
    - * QUI-03A - Quercion ilicis Br.-Bl. ex Molinier 1934
    - * ROB-01C - Quercion roboris Malcuit 1929

G - Woodland, forest and other wooded land
- G1 - Broadleaved deciduous woodland
  - G1.1 - Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]
    - * POP-02A - Alnion incanae Pawlowski et al. 1928
    - * POP-02B - Alno incanae-Salicion pentandrae Kielland-Lund 1981
    - * PUR-01C - Salicion albae Soó 1951
  - G1.2 - Mixed riparian floodplain and gallery woodland
    - * POP-02A - Alnion incanae Pawlowski et al. 1928
    - * POP-02C - Alno-Quercion roboris Horvat 1950
  - G1.3 - Mediterranean riparian woodland
    - * POP-01A - Populion albae Br.-Bl. ex Tchou Yen-Tcheng 1949
    - * POP-01B - Osmundo-Alnion glutinosae (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975
    - * POP-01C - Rhododendro pontici-Prunion lusitanicae A.V. Pérez, Galán et Cabezudo in A.V. Pérez et al. 1999
    - * POP-01D - Platanion orientalis I. Kárpáti et V. Kárpáti 1961
    - * POP-01E - Lauro nobilis-Fraxinion angustifoliae I. Kárpáti et Kárpáti 1961
    - * POP-03A - Salicion canariensis Rivas-Mart. et al. ex Rivas-Mart., Fernández González et Lodi 1999
  - G1.4 - Broadleaved swamp woodland not on acid peat

* ALN-01A - Alnion glutinosae Malcuit 1929
* MOB-02A - Salici pentandrae-Betulion pubescentis Clausnitzer in Dengler et al. 2004
* MOB-02B - Rhamno carthaticae-Betulion pubescentis Clausnitzer in Dengler et al. 2004

G1.5 - Broadleaved swamp woodland on acid peat

* MOB-01A - Sphagno-Betulion pubescentis Passarge 1968
* MOB-01B - Pleurozio-Betulion pubescentis Passarge 1968

G1.6 - [Fagus] woodland

* FAG-01A - Scillo lilio-hyacinthi-Fagion Br.-Bl. 1967
* FAG-01B - Galio rotundifolii-Fagion Gamisans 1975
* FAG-01C - Seslerio-Fagion sylvaticae Passarge 1968
* FAG-01D - Geranio nodosi-Fagion Gentile ex Feoli et Lagonegro 1982
* FAG-01E - Geranio striati-Fagion Gentile 1970
* FAG-01F - Fagion moesiacae Blecic et Lakušic 1970
* FAG-01G - Symphyto cordati-Fagion (Vida 1963) Täuber 1982
* FAG-01H - Endymio non-scripti-Fagion Dierschke (1989) 1998
* FAG-01I - Fagion sylvaticae Luquet 1926
* FAG-01J - Lonicero alpigenae-Fagion (Borhidi ex Soó 1964) Dierschke 1997
* FAG-01K - Aremonio-Fagion Török et al. ex Marincek et al. 1993
* FAG-04A - Fagion orientalis Soó 1964
* ROB-02A - Luzulo-Fagion sylvaticae Lohmeyer et Tx. in Tx. 1954
* ROB-02B - Ilici-Fagion sylvaticae Br.-Bl. 1967
* ROB-02C - Vaccinio-Fagion orientalis Passarge 1981

G1.7 - Thermophilous deciduous woodland

* PUB-01C - Junipero excelsae-Quercion pubescentis Jakucs 1960
* PUB-02A - Aceri tatarici-Quercion Zólyomi 1957
* PUB-02B - Quercion petraeae Issler 1931
* PUB-02C - Convallario majalis-Quercion roboris Shevchyk et Solomakha in Shevchyk et al. 1996
* PUB-02D - Erythronio-Quercion petraeae Ubaldi et al. 1988
* PUB-02E - Carpino orientalis-Quercion pubescentis Korzhenevsky et Shelyag-Sosonko 1983
* PUB-02F - Elytrigio nodosae-Quercion pubescentis Didukh 1996
* PUB-02G - Carpino betuli–Quercion petraeae Grebenshchikov et al. 1990
* PUB-02H - Quercion confertae Horvat 1958
* PUB-02I - Quercion petraeae-cerridis Lakušic et Jovanovic in B. Jovanovic ex Carni et Mucina 2013
* PUB-02J - Fraxino orni-Ostryion Tomažic 1940
* PUB-02K - Crataego laevigati-Quercion cerridis Arrigoni 1997
* PUB-02L - Pino calabricae-Quercion congestae S. Brullo et al. 1999
* PUB-02M - Aceri granatensis-Quercion fagineae (Rivas Goday, Rigual et

Rivas-Mart. in Rivas Goday et al. 1960) Rivas-Mart. 1987

* PUB-02P - Quercion pubescentis-petraeae Br.-Bl. 1932 nom. mut.
* PUB-03B - Quercion macrolepidis Zohary ex Di Pietro, Mucina et Bergmeier 2013

G1.8 - Acidophilous [Quercus]-dominated woodland

* PUB-02B - Quercion petraeae Issler 1931
* PUB-02C - Convallario majalis-Quercion roboris Shevchyk et Solomakha in Shevchyk et al. 1996
* PUB-02D - Erythronio-Quercion petraeae Ubaldi et al. 1988
* ROB-01A - Hymenophyllo-Quercion petraeae Pallas 2000
* ROB-01B - Molinio-Quercion roboris Scamoni et Passarge 1959
* ROB-01C - Quercion roboris Malcuit 1929
* ROB-01D - Quercion robori-pyrenaicae (Braun-Blanquet et al. in P. da Silva et al. 1950 corr. Br.-Bl. et al. 1956) Rivas-Martínez 1975
* ROB-01E - Vaccinio myrtilli-Quercion petraeae Pallas 1996
* ROB-01F - Agrostio-Quercion petraeae Scamoni et Passarge 1959
* ROB-01G - Castaneo-Quercion petraeae Soó 1964
* ROB-01H - Quercion pyrenaicae Rivas Goday ex Rivas.-Mart. 1964

G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

* BRA-01B - Veronico teucrii-Pinion sylvestris Ermakov et Solomeshch in Ermakov et al. 2000
* BRA-01C - Trollio europaei-Pinion sylvestris Fedorov ex Ermakov et al. 2000
* FAG-05A - Betulion carpatico-pubescentis Rivas-Mart. et Costa in Rivas-Mart. et al. 2002
* FAG-05B - Betulion fontquerio-celtibericae Rivas-Mart. et Costa in Rivas-Mart. et al. 2002
* FAG-05C - Aceri obtusati-Populion tremulae Taffetani 2000
* FAG-05D - Ligustro vulgaris-Betulion pubescentis Ge´hu 2006
* PIC-01G - Betulion tortuosae Doing ex Mucina all. nova hoc loco
* PIC-01H - Rhododendro caucasici-Betulion litwinowii Onipchenko 2002

G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

* FAG-02A - Carpinion betuli Issler 1931
* FAG-02B - Pulmonario longifoliae-Quercion roboris Rivas-Mart. et Izco in Rivas-Mart. et al. 2002
* FAG-02C - Physospermo verticillati-Quercion cerridis Biondi et al. ex Biondi, Casavecchia et Biscotti 2013
* FAG-02D - Erythronio-Carpinion (Horvat 1958) Marincek in Wallnöfer et al. 1993
* FAG-02E - Castaneo-Carpinion betuli Quézel et al. 1992
* FAG-02F - Corno-Quercion petraeae Korzhenevsky 1982
* FAG-02G - Paeonio dauricae-Quercion petraeae Didukh 1996

* FAG-02H - Querco roboris-Tilion cordatae Solomeshch et Laivinš ex Bulokhov et Solomeshch 2003
* FAG-02I - Scillo sibericae-Quercion roboris Onyshchenko 2009
* FAG-02J - Lathyro-Quercion roboris Solomeshch et al. 1989 nom. inval.
* FAG-02K - Aconito septentrionalis-Tilion cordatae Solomeshch et al. 1993 nom. inval.
* FAG-02L - Crataego-Carpinion caucasicae Passarge 1981
* FAG-02M - Astrantio–Carpinion caucasicae Passarge 1981
* FAG-03A - Tilio platyphylli-Acerion Klika 1955
* FAG-03C - Lathyro veneti-Taxion baccatae Carni et Mucina 2013
* FAG-03D - Refugial submediterranean laurel-lime ravine forests of Apenninian Peninsula
* FAG-03E - Mesophilous broad-leaved ravine forests in meso- and supra-mediterranean belts of southern Apenninian Peninsula
* FAG-03F - Refugial submediterranean xero-thermophilous broad-leaved ravine forests of Balkan Peninsula
* FAG-03G - Mesophilous broad-leaved ravine ash-maple forests of Balkan Peninsula

G1.B - Non-riverine [Alnus] woodland
* ALN-01A - Alnion glutinosae Malcuit 1929
* POP-02A - Alnion incanae Pawlowski et al. 1928

G1.C - Highly artificial broadleaved deciduous forestry plantations
* RHA-01B - Balloto nigrae-Robinion Hadac et Sofron 1980
* RHA-01C - Chelidonio-Robinion Hadac et Sofron 1980 nom. inval.
* RHA-01D - Euphorbio cyparissiae-Robinion Vítková in Kolbek et al. 2003

G1.D - Fruit and nut tree orchards

G2 - Broadleaved evergreen woodland

G2.1 - Mediterranean evergreen [Quercus] woodland
* QUI-02A - Quercion calliprini Zohary ex Quézel et al. 1992
* QUI-02D - Quercion alnifoliae Barbero et Quézel 1979
* QUI-03A - Quercion ilicis Br.-Bl. ex Molinier 1934
* QUI-03B - Querco rotundifoliae-Oleion sylvestris Barbero et al. in Rivas-Mart. et al. 1986
* QUI-03C - Quercion broteroi Br.-Bl. et al. 1956 corr. Rivas-Mart. 1972
* QUI-03D - Fraxino orni-Quercion ilicis Biondi et al. ex Biondi, Casavecchia et Gigante 2013
* QUI-03E - Cyclamini cretici-Quercion ilicis Barbero et Quézel ex Quézel et al. 1992
* QUI-03F - Arbuto andrachnes-Quercion cocciferae Barbero et Quézel 1979
* QUI-03G - Erico-Quercion ilicis S. Brullo et al. 1977

G2.2 - Eurasian continental sclerophyllous woodland
* QUI-03I - Arbuto unedonis-Laurion nobilis Rivas-Mart., Fernández-González et Loidi 1999

G2.3 - Macaronesian [Laurus] woodland

* AZO-01A - Culcito macrocarpae-Juniperion brevifoliae Lüpnitz 1975
* AZO-02A - Dryopterido azoricae-Laurion azoricae Rivas-Mart. et al. 2002
* AZO-02B - Myrico fayae-Pittosporion undulati Lüpnitz 1976
* LAU-02A - Ixantho viscosae-Laurion azoricae Oberd. ex Santos in Rivas-Mart. et al. 1977
* LAU-02B - Sibthorpio peregrinae-Clethrion arboreae Capelo et al. 2000
* LAU-02C - Visneo mocanerae-Apollonion barbujanae Rivas-Mart. in Capelo et al. 2000

G2.4 - [Olea europaea] - [Ceratonia siliqua] woodland
* QUI-01A - Oleo-Ceratonion siliquae Br.-Bl. ex Guinochet et Drouineau 1944
* QUI-02B - Ceratonio-Pistacion lentisci Zohary ex Zohary et Orshan 1959

G2.5 - [Phoenix] groves
* NER-01F - Rubo sancti-Nerion oleandri Brullo et al. 2004
* OLE-01C - Phoenicion canariensis Rivas-Mart. et Del Arco in Rivas-Mart. et al. 2011

G2.6 - [Ilex aquifolium] woods
* FAG-01I - Fagion sylvaticae Luquet 1926
* FAG-02A - Carpinion betuli Issler 1931
* FAG-02B - Pulmonario longifoliae-Quercion roboris Rivas-Mart. et Izco in Rivas-Mart. et al. 2002
* QUI-03D - Fraxino orni-Quercion ilicis Biondi et al. ex Biondi, Casavecchia et Gigante 2013
* ROB-01B - Molinio-Quercion roboris Scamoni et Passarge 1959
* ROB-01C - Quercion roboris Malcuit 1929
* ROB-02A - Luzulo-Fagion sylvaticae Lohmeyer et Tx. in Tx. 1954

G2.7 - Canary Island heath woodland
* LAU-01A - Myrico fayae-Ericion arboreae Oberd. 1965
* LAU-01B - Polysticho falcinelli-Ericion arboreae Rivas-Mart. et al. 2002
* LAU-01C - Telino canariensis-Adenocarpion foliolosi Rivas-Mart. et al. 1993
* LAU-01D - Bystropogono punctati-Telinion maderensis Capelo et al. 2000
* LAU-01E - Euphorbion melliferae Capelo et al. 2003

G2.8 - Highly artificial broadleaved evergreen forestry plantations

G2.9 - Evergreen orchards and groves

G3 - Coniferous woodland

G3.1 - [Abies] and [Picea] woodland
* FAG-01E - Geranio striati-Fagion Gentile 1970
* FAG-01F - Fagion moesiacae Blecic et Lakušic 1970
* FAG-01G - Symphyto cordati-Fagion (Vida 1963) Täuber 1982
* FAG-01I - Fagion sylvaticae Luquet 1926
* FAG-01J - Lonicero alpigenae-Fagion (Borhidi ex Soó 1964) Dierschke 1997

* FAG-01K - Aremonio-Fagion Török et al. ex Marincek et al. 1993
* FAG-04A - Fagion orientalis Soó 1964
* PIC-01A - Piceion excelsae Pawlowski et al. 1928
* PIC-01B - Abieti-Piceion (Br.-Bl. in Br.-Bl. et al. 1939) Soó 1964
* PIC-01C - Chrysanthemo rotundifolii-Piceion (Krajina 1934) Brezina et Hadac in Hadac 1962
* PIC-01E - Calamagrostio arundinaceae-Abietion Horvat 1962 nom. invers. propos.
* PIC-04A - Aconito rubicundi-Abietion sibiricae Anekhonov et Chytrý 1998
* PUB-02N - Abietion cephalonicae Horvat et al. 1974
* PUB-02O - Paeonio broteroi-Abietion pinsapo (Rivas-Mart. 1987) Rivas-Mart. et al. 2002
* ROB-02A - Luzulo-Fagion sylvaticae Lohmeyer et Tx. in Tx. 1954
* ROB-02C - Vaccinio-Fagion orientalis Passarge 1981

G3.2 - Alpine [Larix] - [Pinus cembra] woodland
* ERI-01A - Erico carneae-Pinion Br.-Bl. in Br.-Bl. et al. 1939 nom. invers. propos.
* PIC-01A - Piceion excelsae Pawlowski et al. 1928

G3.3 - [Pinus uncinata] woodland
* ERI-01A - Erico carneae-Pinion Br.-Bl. in Br.-Bl. et al. 1939 nom. invers. propos.
* PIC-01A - Piceion excelsae Pawlowski et al. 1928
* PIC-01D - Seslerio caeruleae-Pinion uncinatae Vigo 1974

G3.4 - [Pinus sylvestris] woodland south of the taiga
* BRA-01A - Caragano fruticis-Pinion sylvestris Solomeshch et al. 2002
* BRA-01B - Veronico teucrii-Pinion sylvestris Ermakov et Solomeshch in Ermakov et al. 2000
* BRA-01C - Trollio europaei-Pinion sylvestris Fedorov ex Ermakov et al. 2000
* ERI-01A - Erico carneae-Pinion Br.-Bl. in Br.-Bl. et al. 1939 nom. invers. propos.
* ERI-01B - Pulsatillo slavicae-Pinion Fajmonová 1978
* ERI-01D - Erico-Fraxinion orni Horvat 1959 nom. invers. propos.
* ERI-02B - Libanotido intermediae-Pinion sylvestris Didukh 2003
* PIC-02A - Dicrano-Pinion (Libbert 1933) W. Matuszkiewicz 1962
* PYR-01A - Festuco-Pinion sylvestris Passarge 1968
* PYR-02A - Kolerio glaucae-Pinion sylvestris Ermakov 1999
* SAB-01A - Junipero sabinae-Pinion sylvestris Rivas Goday in Rivas Goday et Borja 1961 nom. invers. propos.
* SAB-01C - Junipero hemisphaericae-Pinion sylvestris Rivas-Mart. 1983
* SAB-01D - Avenello ibericae-Pinion ibericae Rivas-Mart. et J.A. Molina in Rivas-Mart., Fernández-González et Loidi 1999
* SAB-02A - Ononido rotundifoliae-Pinion sylvestris Br.-Bl. 1950

G3.5 - [Pinus nigra] woodland

* ERI-01A - Erico carneae-Pinion Br.-Bl. in Br.-Bl. et al. 1939 nom. invers. propos.
* ERI-01C - Fraxino orni-Pinion nigrae Em 1978
* ERI-01D - Erico-Fraxinion orni Horvat 1959 nom. invers. propos.
* ERI-01F - Chamaecytiso hirsuti-Pinion pallasianae Barbero et Quézel ex Quézel 1992
* ERI-02A - Pinion pallasianae Korzhenevsky 1998
* PUB-02N - Abietion cephalonicae Horvat et al. 1974
* PUB-03A - Querco-Cedrion libani Barbero et al. 1974
* SAB-01A - Junipero sabinae-Pinion sylvestris Rivas Goday in Rivas Goday et Borja 1961 nom. invers. propos.
* SAB-01B - Juniperion thuriferae Rivas-Mart. 1969
* SAB-04A - Berberido aetnensis-Pinion laricionis (S. Brullo et al. 2001) Mucina et Theurillat nom. nov. hoc loco
* SAB-04D - Berberido creticae-Juniperion foetidissimae S. Brullo et al. 2001

G3.6 - Subalpine mediterranean [Pinus] woodland

* ERI-01E - Pinion heldreichii Horvat 1946
* PIC-01F - Pinion peucis Horvat 1950

G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

* QUI-01A - Oleo-Ceratonion siliquae Br.-Bl. ex Guinochet et Drouineau 1944
* QUI-01G - Juniperon phoeniceae-Pinon acutisquamae A.V. Pérez et Cabezudo in A.V. Pérez et al. 1988 corr. Rivas-Mart. et al. 2002 nom. invers. propos.
* QUI-02B - Ceratonio-Pistacion lentisci Zohary ex Zohary et Orshan 1959
* QUI-02E - Pinion pineae Feinbrun 1959
* QUI-03D - Fraxino orni-Quercion ilicis Biondi et al. ex Biondi, Casavecchia et Gigante 2013
* QUI-03H - Alkanno baeoticae-Pinion halepensis Mucina et Dimopoulos in Mucina et al. 2009
* SAB-04A - Berberido aetnensis-Pinion laricionis (S. Brullo et al. 2001) Mucina et Theurillat nom. nov. hoc loco

G3.8 - Canary Island [Pinus canariensis] woodland

* CAN-01A - Cisto symphyfolii-Pinion canariensis Rivas Goday et Esteve ex Esteve 1969

G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

* AZO-01A - Culcito macrocarpae-Juniperion brevifoliae Lüpnitz 1975
* CAN-01B - Juniperion cedri Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007
* FAG-01C - Seslerio-Fagion sylvaticae Passarge 1968
* FAG-02A - Carpinion betuli Issler 1931
* FAG-03C - Lathyro veneti-Taxion baccatae Carni et Mucina 2013
* OLE-01A - Mayteno canariensis-Juniperion canariensis Santos et F. Galván ex Santos 1983 corr. Rivas-Mart. et al. 1993

* QUI-01F - Periplocion angustifoliae Rivas-Mart. 1975
* QUI-02C - Acero sempervirentis-Cupression sempervirentis Barbero et Quézel ex Quézel et al. 1992
* SAB-01B - Juniperion thuriferae Rivas-Mart. 1969
* SAB-04B - Juniperion excelso-foetidissimae Em ex Matevski et al. 2010
* SAB-04C - Jasmino-Juniperion excelsae Didukh et al. ex Didukh 1996
* SAB-04D - Berberido creticae-Juniperion foetidissimae S. Brullo et al. 2001

G3.A - [Picea] taiga woodland

* PIC-01A - Piceion excelsae Pawlowski et al. 1928
* PIC-03A - Aconito septentrionalis-Piceion obovatae Solomeshch et al. ex Martynenko et al. 2008
* PIC-05A - Empetro-Piceion obovatae Morozova et al. 2008

G3.B - [Pinus] taiga woodland

* PIC-02A - Dicrano-Pinion (Libbert 1933) W. Matuszkiewicz 1962
* PIC-02B - Cladonio stellaris-Pinion sylvestris Kielland-Lund ex Ermakov et Morozova 2011

G3.C - [Larix] taiga woodland

* PIC-02B - Cladonio stellaris-Pinion sylvestris Kielland-Lund ex Ermakov et Morozova 2011
* PIC-05A - Empetro-Piceion obovatae Morozova et al. 2008

G3.D - Boreal bog conifer woodland

* OXY-02B - Sphagnion medii Kästner et Flössner 1933
* PIC-05A - Empetro-Piceion obovatae Morozova et al. 2008
* VAC-01A - Eriophoro-Pinion sylvestris Passarge 1968
* VAC-01B - Vaccinio uliginosi-Pinion sylvestris Passarge 1968
* VAC-02A - Eriophoro-Piceion abietis Passarge 1968
    * VAC-03A - Calamagrostio canescentis-Piceion abietis Solomeshch in Solomeshch et Grigorjev 1992 nom. inval.

G3.E - Nemoral bog conifer woodland

* OXY-02B - Sphagnion medii Kästner et Flössner 1933
* VAC-01A - Eriophoro-Pinion sylvestris Passarge 1968
* VAC-01B - Vaccinio uliginosi-Pinion sylvestris Passarge 1968
* VAC-02A - Eriophoro-Piceion abietis Passarge 1968

G3.F - Highly artificial coniferous plantations

Appendix B: An updated Crosswalk Syntaxa to EUNIS forest types (B1.7, G1, G2, G3)

OXY-02B - Sphagnion medii Kästner et Flössner 1933
* G3.D - Boreal bog conifer woodland
* G3.E - Nemoral bog conifer woodland

ERI-01A - Erico carneae-Pinion Br.-Bl. in Br.-Bl. et al. 1939 nom. invers. propos.
* G3.2 - Alpine [Larix] - [Pinus cembra] woodland
* G3.3 - [Pinus uncinata] woodland
* G3.4 - [Pinus sylvestris] woodland south of the taiga
* G3.5 - [Pinus nigra] woodland

ERI-01B - Pulsatillo slavicae-Pinion Fajmonová 1978
* G3.4 - [Pinus sylvestris] woodland south of the taiga

ERI-01C - Fraxino orni-Pinion nigrae Em 1978
* G3.5 - [Pinus nigra] woodland

ERI-01D - Erico-Fraxinion orni Horvat 1959 nom. invers. propos.
* G3.4 - [Pinus sylvestris] woodland south of the taiga
* G3.5 - [Pinus nigra] woodland

ERI-01E - Pinion heldreichii Horvat 1946
* G3.6 - Subalpine mediterranean [Pinus] woodland

ERI-01F - Chamaecytiso hirsuti-Pinion pallasianae Barbero et Quézel ex Quézel 1992
* G3.5 - [Pinus nigra] woodland

ERI-02A - Pinion pallasianae Korzhenevsky 1998
* G3.5 - [Pinus nigra] woodland

ERI-02B - Libanotido intermediae-Pinion sylvestris Didukh 2003
* G3.4 - [Pinus sylvestris] woodland south of the taiga

PYR-01A - Festuco-Pinion sylvestris Passarge 1968
* G3.4 - [Pinus sylvestris] woodland south of the taiga

PYR-02A - Kolerio glaucae-Pinion sylvestris Ermakov 1999
* G3.4 - [Pinus sylvestris] woodland south of the taiga

SAB-01A - Junipero sabinae-Pinion sylvestris Rivas Goday in Rivas Goday et Borja 1961 nom. invers. propos.
* G3.4 - [Pinus sylvestris] woodland south of the taiga
* G3.5 - [Pinus nigra] woodland

SAB-01B - Juniperion thuriferae Rivas-Mart. 1969
* G3.5 - [Pinus nigra] woodland
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

SAB-01C - Junipero hemisphaericae-Pinion sylvestris Rivas-Mart. 1983
* G3.4 - [Pinus sylvestris] woodland south of the taiga

SAB-01D - Avenello ibericae-Pinion ibericae Rivas-Mart. et J.A. Molina in Rivas-Mart., Fernández-González et Loidi 1999
* G3.4 - [Pinus sylvestris] woodland south of the taiga

SAB-02A - Ononido rotundifoliae-Pinion sylvestris Br.-Bl. 1950
* G3.4 - [Pinus sylvestris] woodland south of the taiga

SAB-04A - Berberido aetnensis-Pinion laricionis (S. Brullo et al. 2001) Mucina et Theurillat nom. nov. hoc loco
* G3.5 - [Pinus nigra] woodland
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])
SAB-04B - Juniperion excelso-foetidissimae Em ex Matevski et al. 2010
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
SAB-04C - Jasmino-Juniperion excelsae Didukh et al. ex Didukh 1996
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
SAB-04D - Berberido creticae-Juniperion foetidissimae S. Brullo et al. 2001
* G3.5 - [Pinus nigra] woodland
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
PIC-01A - Piceion excelsae Pawlowski et al. 1928
* G3.1 - [Abies] and [Picea] woodland
* G3.2 - Alpine [Larix] - [Pinus cembra] woodland
* G3.3 - [Pinus uncinata] woodland
* G3.A - [Picea] taiga woodland
PIC-01B - Abieti-Piceion (Br.-Bl. in Br.-Bl. et al. 1939) Soó 1964
* G3.1 - [Abies] and [Picea] woodland
PIC-01C - Chrysanthemo rotundifolii-Piceion (Krajina 1934) Brezina et Hadac in Hadac 1962
* G3.1 - [Abies] and [Picea] woodland
PIC-01D - Seslerio caeruleae-Pinion uncinatae Vigo 1974
* G3.3 - [Pinus uncinata] woodland
PIC-01E - Calamagrostio arundinaceae-Abietion Horvat 1962 nom. invers. propos.
* G3.1 - [Abies] and [Picea] woodland
PIC-01F - Pinion peucis Horvat 1950
* G3.6 - Subalpine mediterranean [Pinus] woodland
PIC-01G - Betulion tortuosae Doing ex Mucina all. nova hoc loco
* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]
PIC-01H - Rhododendro caucasici-Betulion litwinowii Onipchenko 2002
* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]
PIC-02A - Dicrano-Pinion (Libbert 1933) W. Matuszkiewicz 1962
* B1.7 - Coastal dune woods
* G3.4 - [Pinus sylvestris] woodland south of the taiga
* G3.B - [Pinus] taiga woodland
PIC-02B - Cladonio stellaris-Pinion sylvestris Kielland-Lund ex Ermakov et Morozova 2011
* G3.B - [Pinus] taiga woodland
* G3.C - [Larix] taiga woodland
PIC-03A - Aconito septentrionalis-Piceion obovatae Solomeshch et al. ex Martynenko et al. 2008
* G3.A - [Picea] taiga woodland
PIC-04A - Aconito rubicundi-Abietion sibiricae Anekhonov et Chytrý 1998

* G3.1 - [Abies] and [Picea] woodland

PIC-05A - Empetro-Piceion obovatae Morozova et al. 2008

* G3.A - [Picea] taiga woodland
* G3.C - [Larix] taiga woodland
* G3.D - Boreal bog conifer woodland

BRA-01A - Caragano fruticis-Pinion sylvestris Solomeshch et al. 2002

* G3.4 - [Pinus sylvestris] woodland south of the taiga

BRA-01B - Veronico teucrii-Pinion sylvestris Ermakov et Solomeshch in Ermakov et al. 2000

* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]
* G3.4 - [Pinus sylvestris] woodland south of the taiga

BRA-01C - Trollio europaei-Pinion sylvestris Fedorov ex Ermakov et al. 2000

* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]
* G3.4 - [Pinus sylvestris] woodland south of the taiga

RHA-01B - Balloto nigrae-Robinion Hadac et Sofron 1980

* G1.C - Highly artificial broadleaved deciduous forestry plantations

RHA-01C - Chelidonio-Robinion Hadac et Sofron 1980 nom. inval.

* G1.C - Highly artificial broadleaved deciduous forestry plantations

RHA-01D - Euphorbio cyparissiae-Robinion Vítková in Kolbek et al. 2003

* G1.C - Highly artificial broadleaved deciduous forestry plantations

FAG-01A - Scillo lilio-hyacinthi-Fagion Br.-Bl. 1967

* G1.6 - [Fagus] woodland

FAG-01B - Galio rotundifolii-Fagion Gamisans 1975

* G1.6 - [Fagus] woodland

FAG-01C - Seslerio-Fagion sylvaticae Passarge 1968

* G1.6 - [Fagus] woodland
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

FAG-01D - Geranio nodosi-Fagion Gentile ex Feoli et Lagonegro 1982

* G1.6 - [Fagus] woodland

FAG-01E - Geranio striati-Fagion Gentile 1970

* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

FAG-01F - Fagion moesiacae Blecic et Lakušic 1970

* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

FAG-01G - Symphyto cordati-Fagion (Vida 1963) Täuber 1982

* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

FAG-01H - Endymio non-scripti-Fagion Dierschke (1989) 1998

* G1.6 - [Fagus] woodland

FAG-01I - Fagion sylvaticae Luquet 1926

* G1.6 - [Fagus] woodland
* G2.6 - [Ilex aquifolium] woods
* G3.1 - [Abies] and [Picea] woodland

FAG-01J - Lonicero alpigenae-Fagion (Borhidi ex Soó 1964) Dierschke 1997

* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

FAG-01K - Aremonio-Fagion Török et al. ex Marincek et al. 1993
    * G1.6 - [Fagus] woodland
    * G3.1 - [Abies] and [Picea] woodland
FAG-02A - Carpinion betuli Issler 1931
    * B1.7 - Coastal dune woods
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
    * G2.6 - [Ilex aquifolium] woods
    * G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
FAG-02B - Pulmonario longifoliae-Quercion roboris Rivas-Mart. et Izco in Rivas-Mart. et al. 2002
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
    * G2.6 - [Ilex aquifolium] woods
FAG-02C - Physospermo verticillati-Quercion cerridis Biondi et al. ex Biondi, Casavecchia et Biscotti 2013
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02D - Erythronio-Carpinion (Horvat 1958) Marincek in Wallnöfer et al. 1993
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02E - Castaneo-Carpinion betuli Quézel et al. 1992
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02F - Corno-Quercion petraeae Korzhenevsky 1982
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02G - Paeonio dauricae-Quercion petraeae Didukh 1996
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02H - Querco roboris-Tilion cordatae Solomeshch et Laivinš ex Bulokhov et Solomeshch 2003
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02I - Scillo sibericae-Quercion roboris Onyshchenko 2009
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02J - Lathyro-Quercion roboris Solomeshch et al. 1989 nom. inval.
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02K - Aconito septentrionalis-Tilion cordatae Solomeshch et al. 1993 nom. inval.
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02L - Crataego-Carpinion caucasicae Passarge 1981
    * G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
FAG-02M - Astrantio–Carpinion caucasicae Passarge 1981

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-03A - Tilio platyphylli-Acerion Klika 1955

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-03C - Lathyro veneti-Taxion baccatae Carni et Mucina 2013

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

FAG-03D - Refugial submediterranean laurel-lime ravine forests of Apenninian Peninsula

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-03E - Mesophilous broad-leaved ravine forests in meso- and supra-mediterranean belts of southern Apenninian Peninsula

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-03F - Refugial submediterranean xero-thermophilous broad-leaved ravine forests of Balkan Peninsula

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-03G - Mesophilous broad-leaved ravine ash-maple forests of Balkan Peninsula

* G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

FAG-04A - Fagion orientalis Soó 1964

* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

FAG-05A - Betulion carpatico-pubescentis Rivas-Mart. et Costa in Rivas-Mart. et al. 2002

* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

FAG-05B - Betulion fontquerio-celtibericae Rivas-Mart. et Costa in Rivas-Mart. et al. 2002

* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

FAG-05C - Aceri obtusati-Populion tremulae Taffetani 2000

* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

FAG-05D - Ligustro vulgaris-Betulion pubescentis Ge´hu 2006

* B1.7 - Coastal dune woods
* G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

PUB-01C - Junipero excelsae-Quercion pubescentis Jakucs 1960

* G1.7 - Thermophilous deciduous woodland

PUB-02A - Aceri tatarici-Quercion Zólyomi 1957

* G1.7 - Thermophilous deciduous woodland

PUB-02B - Quercion petraeae Issler 1931

* G1.7 - Thermophilous deciduous woodland

* G1.8 - Acidophilous [Quercus]-dominated woodland

PUB-02C - Convallario majalis-Quercion roboris Shevchyk et Solomakha in Shevchyk et al. 1996
* G1.7 - Thermophilous deciduous woodland
* G1.8 - Acidophilous [Quercus]-dominated woodland

PUB-02D - Erythronio-Quercion petraeae Ubaldi et al. 1988
* G1.7 - Thermophilous deciduous woodland
* G1.8 - Acidophilous [Quercus]-dominated woodland

PUB-02E - Carpino orientalis-Quercion pubescentis Korzhenevsky et Shelyag-Sosonko 1983
* G1.7 - Thermophilous deciduous woodland

PUB-02F - Elytrigio nodosae-Quercion pubescentis Didukh 1996
* G1.7 - Thermophilous deciduous woodland

PUB-02G - Carpino betuli–Quercion petraeae Grebenshchikov et al. 1990
* G1.7 - Thermophilous deciduous woodland

PUB-02H - Quercion confertae Horvat 1958
* G1.7 - Thermophilous deciduous woodland

PUB-02I - Quercion petraeae-cerridis Lakušic et Jovanovic in B. Jovanovic ex Carni et Mucina 2013
* G1.7 - Thermophilous deciduous woodland

PUB-02J - Fraxino orni-Ostryion Tomažic 1940
* G1.7 - Thermophilous deciduous woodland

PUB-02K - Crataego laevigati-Quercion cerridis Arrigoni 1997
* G1.7 - Thermophilous deciduous woodland

PUB-02L - Pino calabricae-Quercion congestae S. Brullo et al. 1999
* G1.7 - Thermophilous deciduous woodland

PUB-02M - Aceri granatensis-Quercion fagineae (Rivas Goday, Rigual et Rivas-Mart. in Rivas Goday et al. 1960) Rivas-Mart. 1987
* G1.7 - Thermophilous deciduous woodland

PUB-02N - Abietion cephalonicae Horvat et al. 1974
* G3.1 - [Abies] and [Picea] woodland
* G3.5 - [Pinus nigra] woodland

PUB-02O - Paeonio broteroi-Abietion pinsapo (Rivas-Mart. 1987) Rivas-Mart. et al. 2002
* G3.1 - [Abies] and [Picea] woodland

PUB-02P - Quercion pubescenti-petraeae Br.-Bl. 1932 nom. mut.
* G1.7 - Thermophilous deciduous woodland

PUB-03A - Querco-Cedrion libani Barbero et al. 1974
* G3.5 - [Pinus nigra] woodland

PUB-03B - Quercion macrolepidis Zohary ex Di Pietro, Mucina et Bergmeier 2013
* G1.7 - Thermophilous deciduous woodland

ROB-01A - Hymenophyllo-Quercion petraeae Pallas 2000
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-01B - Molinio-Quercion roboris Scamoni et Passarge 1959
* G1.8 - Acidophilous [Quercus]-dominated woodland
* G2.6 - [Ilex aquifolium] woods

ROB-01C - Quercion roboris Malcuit 1929
* B1.7 - Coastal dune woods
* G1.8 - Acidophilous [Quercus]-dominated woodland

* G2.6 - [Ilex aquifolium] woods

ROB-01D - Quercion robori-pyrenaicae (Braun-Blanquet et al. in P. da Silva et al. 1950 corr. Br.-Bl. et al. 1956) Rivas-Martínez 1975
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-01E - Vaccinio myrtilli-Quercion petraeae Pallas 1996
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-01F - Agrostio-Quercion petraeae Scamoni et Passarge 1959
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-01G - Castaneo-Quercion petraeae Soó 1964
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-01H - Quercion pyrenaicae Rivas Goday ex Rivas.-Mart. 1964
* G1.8 - Acidophilous [Quercus]-dominated woodland

ROB-02A - Luzulo-Fagion sylvaticae Lohmeyer et Tx. in Tx. 1954
* G1.6 - [Fagus] woodland
* G2.6 - [Ilex aquifolium] woods
* G3.1 - [Abies] and [Picea] woodland

ROB-02B - Ilici-Fagion sylvaticae Br.-Bl. 1967
* G1.6 - [Fagus] woodland

ROB-02C - Vaccinio-Fagion orientalis Passarge 1981
* G1.6 - [Fagus] woodland
* G3.1 - [Abies] and [Picea] woodland

QUI-01A - Oleo-Ceratonion siliquae Br.-Bl. ex Guinochet et Drouineau 1944
* B1.7 - Coastal dune woods
* G2.4 - [Olea europaea] - [Ceratonia siliqua] woodland
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-01F - Periplocion angustifoliae Rivas-Mart. 1975
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

QUI-01G - Juniperon phoeniceae-Pinon acutisquamae A.V. Pérez et Cabezudo in A.V. Pérez et al. 1988 corr. Rivas-Mart. et al. 2002 nom. invers. propos.
* B1.7 - Coastal dune woods
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-02A - Quercion calliprini Zohary ex Quézel et al. 1992
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-02B - Ceratonio-Pistacion lentisci Zohary ex Zohary et Orshan 1959
* G2.4 - [Olea europaea] - [Ceratonia siliqua] woodland
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-02C - Acero sempervirentis-Cupression sempervirentis Barbero et Quézel ex Quézel et al. 1992
* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

QUI-02D - Quercion alnifoliae Barbero et Quézel 1979
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-02E - Pinion pineae Feinbrun 1959
* B1.7 - Coastal dune woods

* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-03A - Quercion ilicis Br.-Bl. ex Molinier 1934
* B1.7 - Coastal dune woods
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03B - Querco rotundifoliae-Oleion sylvestris Barbero et al. in Rivas-Mart. et al. 1986
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03C - Quercion broteroi Br.-Bl. et al. 1956 corr. Rivas-Mart. 1972
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03D - Fraxino orni-Quercion ilicis Biondi et al. ex Biondi, Casavecchia et Gigante 2013
* G2.1 - Mediterranean evergreen [Quercus] woodland
* G2.6 - [Ilex aquifolium] woods
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-03E - Cyclamini cretici-Quercion ilicis Barbero et Quézel ex Quézel et al. 1992
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03F - Arbuto andrachnes-Quercion cocciferae Barbero et Quézel 1979
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03G - Erico-Quercion ilicis S. Brullo et al. 1977
* G2.1 - Mediterranean evergreen [Quercus] woodland

QUI-03H - Alkanno baeoticae-Pinion halepensis Mucina et Dimopoulos in Mucina et al. 2009
* G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

QUI-03I - Arbuto unedonis-Laurion nobilis Rivas-Mart., Fernández-González et Loidi 1999
* G2.2 - Eurasian continental sclerophyllous woodland

POP-01A - Populion albae Br.-Bl. ex Tchou Yen-Tcheng 1949
* G1.3 - Mediterranean riparian woodland

POP-01B - Osmundo-Alnion glutinosae (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975
* G1.3 - Mediterranean riparian woodland

POP-01C - Rhododendro pontici-Prunion lusitanicae A.V. Pérez, Galán et Cabezudo in A.V. Pérez et al. 1999
* G1.3 - Mediterranean riparian woodland

POP-01D - Platanion orientalis I. Kárpáti et V. Kárpáti 1961
* G1.3 - Mediterranean riparian woodland

POP-01E - Lauro nobilis-Fraxinion angustifoliae I. Kárpáti et Kárpáti 1961
* G1.3 - Mediterranean riparian woodland

POP-02A - Alnion incanae Pawlowski et al. 1928
* B1.7 - Coastal dune woods
* G1.1 - Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]
* G1.2 - Mixed riparian floodplain and gallery woodland
* G1.B - Non-riverine [Alnus] woodland

POP-02B - Alno incanae-Salicion pentandrae Kielland-Lund 1981

* G1.1 - Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]

POP-02C - Alno-Quercion roboris Horvat 1950

* G1.2 - Mixed riparian floodplain and gallery woodland

POP-03A - Salicion canariensis Rivas-Mart. et al. ex Rivas-Mart., Fernández González et Lodi 1999

* G1.3 - Mediterranean riparian woodland

PUR-01C - Salicion albae Soó 1951

* G1.1 - Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]

ALN-01A - Alnion glutinosae Malcuit 1929

* G1.4 - Broadleaved swamp woodland not on acid peat
* G1.B - Non-riverine [Alnus] woodland

VAC-01A - Eriophoro-Pinion sylvestris Passarge 1968

* G3.D - Boreal bog conifer woodland
* G3.E - Nemoral bog conifer woodland

VAC-01B - Vaccinio uliginosi-Pinion sylvestris Passarge 1968

* G3.D - Boreal bog conifer woodland
* G3.E - Nemoral bog conifer woodland

VAC-02A - Eriophoro-Piceion abietis Passarge 1968

* G3.D - Boreal bog conifer woodland
* G3.E - Nemoral bog conifer woodland

VAC-03A - Calamagrostio canescentis-Piceion abietis Solomeshch in Solomeshch et Grigorjev 1992 nom. inval.

* G3.D - Boreal bog conifer woodland

MOB-01A - Sphagno-Betulion pubescentis Passarge 1968

* G1.5 - Broadleaved swamp woodland on acid peat

MOB-01B - Pleurozio-Betulion pubescentis Passarge 1968

* G1.5 - Broadleaved swamp woodland on acid peat

MOB-02A - Salici pentandrae-Betulion pubescentis Clausnitzer in Dengler et al. 2004

* G1.4 - Broadleaved swamp woodland not on acid peat

MOB-02B - Rhamno carthaticae-Betulion pubescentis Clausnitzer in Dengler et al. 2004

* G1.4 - Broadleaved swamp woodland not on acid peat

NER-01F - Rubo sancti-Nerion oleandri Brullo et al. 2004

* G2.5 - [Phoenix] groves

OLE-01A - Mayteno canariensis-Juniperion canariensis Santos et F. Galván ex Santos 1983 corr. Rivas-Mart. et al. 1993

* G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

OLE-01C - Phoenicion canariensis Rivas-Mart. et Del Arco in Rivas-Mart. et al. 2011

* G2.5 - [Phoenix] groves

LAU-01A - Myrico fayae-Ericion arboreae Oberd. 1965

* G2.7 - Canary Island heath woodland

LAU-01B - Polysticho falcinelli-Ericion arboreae Rivas-Mart. et al. 2002

* G2.7 - Canary Island heath woodland

LAU-01C - Telino canariensis-Adenocarpion foliolosi Rivas-Mart. et al. 1993

* G2.7 - Canary Island heath woodland

LAU-01D - Bystropogono punctati-Telinion maderensis Capelo et al. 2000
    * G2.7 - Canary Island heath woodland
LAU-01E - Euphorbion melliferae Capelo et al. 2003
    * G2.7 - Canary Island heath woodland
LAU-02A - Ixantho viscosae-Laurion azoricae Oberd. ex Santos in Rivas-Mart. et al. 1977
    * G2.3 - Macaronesian [Laurus] woodland
LAU-02B - Sibthorpio peregrinae-Clethrion arboreae Capelo et al. 2000
    * G2.3 - Macaronesian [Laurus] woodland
LAU-02C - Visneo mocanerae-Apollonion barbujanae Rivas-Mart. in Capelo et al. 2000
    * G2.3 - Macaronesian [Laurus] woodland
AZO-01A - Culcito macrocarpae-Juniperion brevifoliae Lüpnitz 1975
    * G2.3 - Macaronesian [Laurus] woodland
    * G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
AZO-02A - Dryopterido azoricae-Laurion azoricae Rivas-Mart. et al. 2002
    * G2.3 - Macaronesian [Laurus] woodland
AZO-02B - Myrico fayae-Pittosporion undulati Lüpnitz 1976
    * G2.3 - Macaronesian [Laurus] woodland
CAN-01A - Cisto symphyfolii-Pinion canariensis Rivas Goday et Esteve ex Esteve 1969
    * G3.8 - Canary Island [Pinus canariensis] woodland
CAN-01B - Juniperion cedri Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007
    * G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

Appendix C: Tabular crosswalk between EUNIS & European Forest Types with proposed changes to EUNIS and implications for EFT

EUNIS type	EFT type (2010)	Proposed change to EUNIS	Implications for EFT
B1.7 Coastal dune woods	2.7 Atlantic Maritime pine forest		
G1.1 Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]	12.1 Riparian forest		
G1.2 Mixed riparian floodplain and gallery woodland	12.2 Fluvial forest		
G1.3 Mediterranean riparian woodland	12.3 Mediterranean and Macaronesian riparian forest		
G1.4 Broadleaved swamp woodland not on acid peat	11.2 Alder swamp forest, 11.4 Pedunculate oak swamp forest, 11.5 Aspen swamp forest		
G1.5 Broadleaved swamp woodland on acid peat	11.3 Birch swamp forest		
G1.6 [Fagus] woodland	6.1 Lowland beech forest of southern Scandinavia and north central Europe, 6.2 Atlantic and subatlantic lowland beech forest, 6.3 Subatlantic to Atlanto-Mediterranean submountainous beech forest, 6.4 Central European submountainous beech forest, 6.5 Carpathian submountainous beech forest, 6.6 Illyrian submountainous beech forest, 6.7 Moesian submountainous beech forest, 7.1 South-western European mountainous beech forest, 7.2 Central European mountainous beech forest, 7.3 Apennine-Corsican mountainous beech forest, 7.4 Illyrian mountainous beech forest, 7.5 Carpathian mountainous beech forest, 7.6 Moesian mountainous beech forest, 7.7 Crimean beech forest, 7.8 Oriental beech and hornbeam-oriental beech forest	G1.6' Fagus woodland on non-acid soils	Split cross-cuts EFT typology
G1.6 [Fagus] woodland		G1.6'' Fagus woodland on acid soils	
G1.7 Thermophilous deciduous woodland	8.1 Downy oak forest, 8.2 Turkey oak, Hungarian oak and Sessile oak forest, 8.3 Pyrenean oak forest, 8.4 Portugese oak and Mirbeck's oak Iberian forest, 8.5 Macedonian oak forest, 8.6 Valonia oak forest, 8.7 Chestnut forest, 8.8 Other thermophilous deciduous forests		

G1.8 Acidophilous [Quercus]-dominated woodland	4.1 Acidophylous oakwood, 4.2 Oak-birch forest		
G1.9 Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]	3.4 Mountainous birch forest, 13.3 Birch forest, 13.4 Aspen forest	G1.9' Mountain betula & Populus tremula woodland on mineral soils	3.4 Mountainous birch forest
G1.9 Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]		G1.9'' Lowland Continental Betula and Populus tremula woodland on mineral soils	13.3 Birch forest, 13.4 Aspen forest
G1.A Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland	5.1 Pedunculate oak-hornbeam forest, 5.2 Sessile oak-hornbeam forest, 5.3 Ashwood and oak-ash forest, 5.4 Maple-oak forest, 5.5 Lime-oak forest, 5.6 Maple-lime forest, 5.7 Lime forest, 5.8 Ravine and slope forest, 5.9 Other mesohpytic deciduous forests		
G1.B Non-riverine [Alnus] woodland	13.1 Alder forest, 13.2 Italian alder forest		
G1.C Highly artificial broadleaved deciduous forestry plantations			
G2.1 Mediterranean evergreen [Quercus] woodland	9.1 Mediterranean evergreen oak forest		
G2.2 Eurasian continental sclerophyllous woodland	9.5 Other sclerophlyllous forest		
G2.3 Macaronesian [Laurus] woodland	9.4 Macaronesian laurisilva		
G2.4 [Olea europaea] - [Ceratonia siliqua] woodland	9.2 Olive-carob forest		
G2.5 [Phoenix] groves	9.3 Palm groves		
G2.6 [Ilex aquifolium] woods	9.5 Other sclerophlyllous forest		
G2.7 Canary Island heath woodland	9.5 Other sclerophlyllous forest		
G3.1 [Abies] and [Picea] woodland	2.3 Nemoral spruce forest, 3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest, 2.8 Nemoral Silver fir forest, 7.9 Mountainous Silver fir forest, 10.6 Mediterranean and Anatolian fir forest	G3.1' Temperate mountain Picea woodland	2.3 Nemoral spruce forest, 3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest
G3.1 [Abies] and [Picea] woodland		G3.1'' Temperate mountain Abies woodland	2.8 Nemoral Silver fir forest
G3.1 [Abies] and [Picea] woodland		G3.1''' Mediterranean mountain Abies woodland	7.9 Mountainous Silver fir forest, 10.6 Mediterranean and Anatolian fir forest
G3.2 Alpine [Larix] - [Pinus cembra] woodland	3.1 Subalpine larch-arolla pine and dwarf pine forest		

G3.3 [Pinus uncinata] woodland	3.1 Subalpine larch-arolla pine and dwarf pine forest	G3.3 [Pinus uncinata] woodland should be merged into G3.2 [Alpine [Larix] - [Pinus cembra] woodland] (this category corresponds to the same phytosociological units, with Pinus species as the usual dominant)]	
G3.4 [Pinus sylvestris] woodland south of the taiga	2.2 Nemoral Scots pine forest, 3.3 AlpineScots pine and Black pine forest, 10.4 Mediterranean and Anatolian Scots pine forest	G3.4' Temperate Continental Pinus sylvestris woodland	2.2 Nemoral Scots pine forest, 2.4 Nemoral Black pine forest
G3.4 [Pinus sylvestris] woodland south of the taiga		G3.4'' Temperate and sub-mediterranean montane Pinus-sylvestris-Pinis nigra woodland	3.3 Alpine Scots pine & black pine forest
G3.5 [Pinus nigra] woodland	2.4 Nemoral Black pine forest, 10.2 Mediterranean and Anatolian Black pine forest	G3.4''' Mediterranean-montane Pinus sylvestris-Pinus nigra woodland, ??G3.5 [Pinus nigra] woodland should to be merged into the G3.4'' and G3.4''' types	10.2 Mediterranean and Anatolian Black pine forest. 10.4 Mediterranean and Anatolian Scots pine forest
G3.6 Subalpine mediterranean [Pinus] woodland	10.5 Alti-Mediterranean pine forest		
G3.7 Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])	2.7 Atlantic Maritime pine forest, 10.1 Mediterranean pine forest		
G3.8 Canary Island [Pinus canariensis] woodland	10.3 Canarian pine forest		
G3.9 Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]	10.7 Juniper forest, 10.8 Cypress forest, 10.9 Cedar forest, 10.10 Tetraclinis articulata stands, 10.11 Mediterranean yew stands	G3.9' Taxus baccata woodland	10.11 Mediterranean yew stands
G3.9 Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]		G3.9' Mediterranean Cupressaceae woodland	10.7 Juniper forest (some), 10.8 Cypress forest, 10.9 Cedar forest, 10.10 Tetrac
G3.9 Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]		G3.9''' Macaronesian Juniperus woodland	10.7 Juniper forest (some)
G3.A [Picea] taiga woodland	1.1 Spruce and spruce-birch boreal forest		

G3.B [Pinus] taiga woodland	1.2 Pine and pine-birch boreal forest		
G3.C [Larix] taiga woodland			
G3.D Boreal bog conifer woodland	11.1 Spruce mire forest, 11.2 Pine mire forest		
G3.E Nemoral bog conifer woodland	11.1 Spruce mire forest, 11.2 Pine mire forest		
G2.9 is not a woodland and should be removed, could go into EUNIS group I		G2.9 is not a woodland and should be removed, could go into EUNIS group I	
G1.D is not a woodland and should be removed, could go into EUNIS group I		G1.D is not a woodland and should be removed, could go into EUNIS group I	
G2.8 Broadleaved evergreen plantations of non site-native trees* [Highly artificial broadleaved evergreen forestry plantations]			

Appendix D: Fact sheets EUNIS forest habitat types

B1.7 Coastal dune woods
G1.1 Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]
G1.2 Mixed riparian floodplain and gallery woodland
G1.3 Mediterranean riparian woodland
G1.4 Broadleaved swamp woodland not on acid peat
G1.5 Broadleaved swamp woodland on acid peat
G1.6 [Fagus] woodland
G1.7 Thermophilous deciduous woodland
G1.8 Acidophilous [Quercus]-dominated woodland
G1.9 Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]
G1.A Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
G1.B Non-riverine [Alnus] woodland
G1.C Highly artificial broadleaved deciduous forestry plantations
G1.D Fruit and nut tree orchards
G2.1 Mediterranean evergreen [Quercus] woodland
G2.2 Eurasian continental sclerophyllous woodland
G2.3 Macaronesian [Laurus] woodland
G2.4 [Olea europaea] - [Ceratonia siliqua] woodland
G2.5 - [Phoenix] groves
G2.6 [Ilex aquifolium] woods
G2.7 Canary Island heath woodland
G2.8 Highly artificial broadleaved evergreen forestry plantations
G2.9 Evergreen orchards and groves
G3.1 [Abies] and [Picea] woodland
G3.2 Alpine [Larix] - [Pinus cembra] woodland
G3.3 [Pinus uncinata] woodland
G3.4 [Pinus sylvestris] woodland south of the taiga
G3.5 [Pinus nigra] woodland
G3.6 - Subalpine mediterranean [Pinus] woodland
G3.7 Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])
G3.8 Canary Island [Pinus canariensis] woodland
G3.9 Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
G3.A [Picea] taiga woodland
G3.B [Pinus] taiga woodland
G3.C [Larix] taiga woodland
G3.D Boreal bog conifer woodland
G3.E Nemoral bog conifer woodland

Not covered by in-situ vegetation data are G1.D 'Fruit and nut tree orchards', G2.8 'Highly artificial broadleaved evergreen forestry plantations', G 2.9 'Evergreen orchards and groves', and G3.C '[Larix] taiga woodland', as these

units are no woodlands (G1.D, G2.9), floristically difficult to define and/or to assign to syntaxa (G.2.8) or because there are no data available (G3.C).

In the tables of the floristic composition of the individual EUNIS types, all species with a frequency > 10 % are mentioned. The full species lists will be provided electronically.

B1.7 - Coastal dune woods

European Forest Type: 2.7 Atlantic Maritime pine forest

Origin of data (countries): DE, FR, GB, GR, HR, IT, NL, PL

List of alliances: FAG-02A, FAG-05D, PIC-02A, POP-02A, QUI-01A, QUI-01G, QUI-02E, QUI-03A, ROB-01C

Additional selection rules: Of the listed alliances, only relevés occurring in coastal areas were used

Implications for EUNIS classification: proposed new name: Coastal dune woodland

Implications for EFT classification: n/a

Floristic composition:

Quercus robur	40	Asparagus acutifolius	16
Acer pseudoplatanus	38	Betula pubescens	16
Crataegus monogyna agg.	33	Silene dioica	16
Urtica dioica	31	Rubus caesius	15
Hedera helix	30	Corylus avellana	14
Sorbus aucuparia	30	Pistacia lentiscus	14
Fraxinus excelsior	27	Pteridium aquilinum	14
Eurhynchium praelongum	24	Hyacinthoides non-scripta	13
Lonicera periclymenum	23	Ilex aquifolium	13
Dryopteris carthusiana agg.	21	Moehringia trinervia	13
Fagus sylvatica	21	Oxalis acetosella	13
Glechoma hederacea agg.	21	Poa trivialis	13
Sambucus nigra	21	Betula pendula	12
Geum urbanum	20	Holcus mollis	12
Rubus fruticosus agg.	20	Alliaria petiolata	11
Brachythecium rutabulum	19	Alnus glutinosa	11
Galium aparine	19	Calamagrostis epigejos	11
Geranium robertianum	19	Deschampsia flexuosa	11
Mnium hornum	18	Euonymus europaeus	11
Quercus ilex subsp. Ilex	18	Prunus serotina	11
Rubia peregrina	17	Agrostis capillaris	10
Smilax aspera	17	Dactylis glomerata agg.	10

G1.1 - Riparian and gallery woodland, with dominant [Alnus], [Betula], [Populus] or [Salix]

European Forest Type: 12.1 Riparian forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, GR, HR, HU, IT, NL, PL, RO, RU, SI, SK, SM

List of alliances: POP-02A, POP-02B, PUR-01C

Additional selection rules: Relevés of alliance POP-02A with occurrence of Fraxinus angustifolia (and any of its subspecies) and relevés with a cover of Quercus robur > 50% were excluded

Implications for EUNIS classification: proposed new name: Temperate and boreal softwood riparian woodland

Implications for EFT classification: n/a

Floristic composition:

Urtica dioica	63	Brachythecium rutabulum	16
Fraxinus excelsior	47	Sorbus aucuparia	16
Alnus glutinosa	39	Hedera helix	15
Galium aparine	36	Solanum dulcamara	15
Sambucus nigra	34	Plagiomnium undulatum	15
Glechoma hederacea agg.	33	Cirsium oleraceum	14
Rubus caesius	32	Eurhynchium praelongum	14
Geum urbanum	30	Lamiastrum galeobdolon agg.	14
Aegopodium podagraria	29	Ajuga reptans	14
Acer pseudoplatanus	29	Viburnum opulus	14
Poa trivialis	28	Lysimachia vulgaris	13
Crataegus monogyna agg.	28	Alliaria petiolata	13
Deschampsia cespitosa	25	Rubus fruticosus agg.	13
Corylus avellana	25	Silene dioica	12
Stachys sylvatica	24	Lamium maculatum	12
Quercus robur	23	Anthriscus sylvestris	12
Ranunculus repens	23	Carex remota	12
Brachypodium sylvaticum	22	Moehringia trinervia	12
Geranium robertianum	22	Dactylis glomerata agg.	12
Prunus padus	22	Caltha palustris	12
Angelica sylvestris	22	Heracleum sphondylium	12
Impatiens noli-tangere	22	Acer campestre	12
Filipendula ulmaria	21	Chaerophyllum hirsutum	12
Athyrium filix-femina	20	Fagus sylvatica	12
Cornus sanguinea	20	Lycopus europaeus	11
Dryopteris carthusiana agg.	20	Carex sylvatica	11
Circaea lutetiana	19	Galeopsis tetrahit	11

Humulus lupulus	19	Paris quadrifolia	11
Ranunculus ficaria	19	Iris pseudacorus	10
Alnus incana	19	Phragmites australis	10
Oxalis acetosella	19	Myosotis scorpioides agg.	10
Festuca gigantea	18	Poa nemoralis	10
Euonymus europaeus	18	Asarum europaeum	10
Phalaris arundinacea	17	Equisetum arvense	10
Salix alba	17	Impatiens parviflora	10
Anemone nemorosa	16	Picea abies	10
Rubus idaeus	16	Symphytum officinale	10

G1.2 - Mixed riparian floodplain and gallery woodland

European Forest Type: 12.2 Fluvial forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, GR, HR, HU, IT, NL, PL, RO, RU, SI, SK

List of alliances: POP-02A, POP-02C

Additional selection rules: Relevés of alliance POP-02A with occurrence of Alnus incana and relevés with a cover of Alnus glutinosa, Populus alba, P. nigra, Salix alba or S. fragilis > 25% were excluded

Implications for EUNIS classification: proposed new name: Temperate and boreal hardwood riparian woodland

Implications for EFT classification: n/a

Floristic composition:

Urtica dioica	59	Brachythecium rutabulum	17
Fraxinus excelsior	58	Lonicera periclymenum	17
Crataegus monogyna agg.	56	Festuca gigantea	17
Quercus robur	51	Carex remota	16
Geum urbanum	42	Ulmus minor	16
Glechoma hederacea agg.	42	Angelica sylvestris	16
Sambucus nigra	40	Polygonatum multiflorum	16
Galium aparine	37	Oxalis acetosella	16
Acer pseudoplatanus	37	Silene dioica	16
Alnus glutinosa	36	Filipendula ulmaria	15
Corylus avellana	36	Ajuga reptans	15
Rubus caesius	33	Poa nemoralis	15
Geranium robertianum	28	Ligustrum vulgare	14
Hedera helix	28	Carpinus betulus	14
Aegopodium podagraria	26	Galeopsis tetrahit	13
Brachypodium sylvaticum	26	Dactylis glomerata agg.	13
Euonymus europaeus	26	Carex sylvatica	13
Circaea lutetiana	25	Lysimachia vulgaris	12
Cornus sanguinea	24	Lysimachia nummularia	12
Prunus padus	24	Mnium hornum	12
Ranunculus ficaria	24	Plagiomnium undulatum	12
Acer campestre	23	Viola reichenbachiana	12
Stachys sylvatica	23	Frangula alnus	12
Deschampsia cespitosa	23	Lamiastrum galeobdolon agg.	12
Poa trivialis	22	Scrophularia nodosa	12
Sorbus aucuparia	22	Rumex sanguineus	12
Dryopteris carthusiana agg.	22	Heracleum sphondylium	11
Alliaria petiolata	20	Rubus idaeus	11

Rubus fruticosus agg.	20	Dryopteris filix-mas	11
Fagus sylvatica	20	Anthriscus sylvestris	11
Moehringia trinervia	20	Mercurialis perennis	10
Eurhynchium praelongum	19	Prunus spinosa	10
Athyrium filix-femina	19	Iris pseudacorus	10
Anemone nemorosa	18	Impatiens noli-tangere	10
Viburnum opulus	18	Ribes rubrum	10
Ranunculus repens	18	Stellaria holostea	10
Humulus lupulus	17		

G1.3 - Mediterranean riparian woodland

European Forest Type: 12.3 Mediterranean and Macaronesian riparian forest

Origin of data (countries): ES, FR, GR, IT

List of alliances: POP-01A, POP-01B, POP-01C, POP-01D, POP-01E, POP-03A

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Mediterranean and Macaronesion riparian woodland

Implications for EFT classification: n/a

Floristic composition:

Rubus ulmifolius	58	Galium aparine	14
Brachypodium sylvaticum	45	Athyrium filix-femina	14
Fraxinus angustifolia	41	Oenanthe crocata	14
Crataegus monogyna agg.	35	Rubus caesius	14
Alnus glutinosa	31	Cornus sanguinea	13
Ulmus minor	31	Teucrium scorodonia	12
Salix atrocinerea	24	Poa nemoralis	12
Populus nigra	23	Dactylis glomerata agg.	12
Tamus communis	22	Sambucus nigra	11
Clematis vitalba	22	Smilax aspera	11
Hedera helix	20	Prunella vulgaris	11
Populus alba	19	Ruscus aculeatus	11
Pteridium aquilinum	19	Asparagus acutifolius	11
Bryonia cretica subsp. Dioica	18	Carex elata	11
Arum italicum	16	Geum urbanum	11
Urtica dioica	16	Rubia peregrina	11
Platanus orientalis	15	Rosa canina agg.	10
Carex pendula	15	Corylus avellana	10
Hedera maroccana	14	Scirpoides holoschoenus	10
Lonicera periclymenum	14	Frangula alnus	10

G1.4 - Broadleaved swamp woodland not on acid peat

European Forest Type: 11.2 Alder swamp forest, 11.4 Pedunculate oak swamp forest, 11.5 Aspen swamp forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, HR, HU, NL, PL, SK

List of alliances: ALN-01A, MOB-02A, MOB-02B

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Broadleaved swamp woodland on non-acid peat

Implications for EFT classification: n/a

Floristic composition:

Alnus glutinosa	81	Prunus padus	19
Dryopteris carthusiana agg.	55	Humulus lupulus	18
Lysimachia vulgaris	47	Ranunculus repens	18
Solanum dulcamara	43	Carex elata	18
Lycopus europaeus	37	Mnium hornum	18
Frangula alnus	34	Poa trivialis	18
Urtica dioica	33	Fraxinus excelsior	17
Galium palustre	31	Angelica sylvestris	16
Iris pseudacorus	31	Eupatorium cannabinum	16
Carex elongata	27	Viburnum opulus	16
Athyrium filix-femina	25	Calliergonella cuspidata	16
Calamagrostis canescens	25	Scutellaria galericulata	16
Salix cinerea	25	Rubus idaeus	15
Lythrum salicaria	25	Carex remota	14
Deschampsia cespitosa	24	Mentha aquatica	13
Peucedanum palustre	24	Equisetum fluviatile	13
Sorbus aucuparia	24	Lonicera periclymenum	13
Filipendula ulmaria	23	Carex paniculata	12
Juncus effusus	23	Myosotis scorpioides agg.	12
Cirsium palustre	22	Sambucus nigra	12
Betula pubescens	22	Brachythecium rutabulum	12
Caltha palustris	21	Holcus lanatus	11
Rubus fruticosus agg.	21	Scirpus sylvaticus	11
Phragmites australis	21	Cardamine amara	11
Quercus robur	20	Cirsium oleraceum	11
Thelypteris palustris	20	Galium aparine	11
Carex acutiformis	20	Eurhynchium praelongum	10

G1.5 - Broadleaved swamp woodland on acid peat

European Forest Type: 11.3 Birch swamp forest

Origin of data (countries): AT, DE, GB, NL, SK

List of alliances: MOB-01A, MOB-01B

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Broadleaved swamp woodland on acid peat

Implications for EFT classification: n/a

Floristic composition:

Betula pubescens	91	Polytrichum commune	18
Dryopteris carthusiana agg.	57	Holcus lanatus	17
Molinia caerulea	53	Agrostis canina	16
Sorbus aucuparia	44	Betula pendula	15
Frangula alnus	41	Sphagnum fimbriatum	15
Quercus robur	40	Vaccinium myrtillus	14
Alnus glutinosa	37	Deschampsia flexuosa	13
Rubus fruticosus agg.	36	Eurhynchium praelongum	13
Juncus effusus	30	Galium palustre	12
Mnium hornum	26	Sphagnum squarrosum	12
Salix cinerea	25	Aulacomnium palustre	11
Calamagrostis canescens	23	Carex curta	11
Sphagnum palustre	23	Carex nigra	10
Lysimachia vulgaris	22	Eriophorum vaginatum	10
Phragmites australis	22	Salix aurita	10
Lonicera periclymenum	20	Solanum dulcamara	10
Pinus sylvestris	18		

G1.6 - [Fagus] woodland

European Forest Type: 6.1 Lowland beech forest of southern Scandinavia and north central Europe, 6.2 Atlantic and subatlantic lowland beech forest, 6.3 Subatlantic to Atlanto-Mediterranean submountainous beech forest, 6.4 Central European submountainous beech forest, 6.5 Carpathian submountainous beech forest, 6.6 Illyrian submountainous beech forest, 6.7 Moesian submountainous beech forest, 7.1 South-western European mountainous beech forest, 7.2 Central European mountainous beech forest, 7.3 Apennine-Corsican mountainous beech forest, 7.4 Illyrian mountainous beech forest, 7.5 Carpathian mountainous beech forest, 7.6 Moesian mountainous beech forest, 7.7 Crimean beech forest, 7.8 Oriental beech and hornbeam-oriental beech forest

Origin of data (countries): AT, BE, BG, CH, CZ, DU, ES, FR, GB, GR, HR, HU, IE, IT, NL, PL, RO, RU, SE, SI, SK, XK

List of alliances: FAG-01A, FAG-01B, FAG-01C, FAG-01D, FAG-01E, FAG-01F, FAG-01G, FAG-01H, FAG-01I, FAG-01J, FAG-01K, FAG-04A, ROB-02A, ROB-02B, ROB-02C

Additional selection rules: Instead of the relevés belonging to the listed alliances, all relevés with a cover of Fagus sylvatica, F. moesiaca or F. orientalis > 50% were assigned to this EUNIS type

Implications for EUNIS classification: G1.6’ Fagus woodland on non-acid soils, G1.6’’ Fagus woodland on acid soils

Implications for EFT classification: Split cross-cuts EFT typology (G1.6’)

Floristic composition:

Fagus sylvatica	95	Euphorbia amygdaloides	15
Galium odoratum	40	Fragaria vesca	15
Oxalis acetosella	37	Pteridium aquilinum	15
Acer pseudoplatanus	36	Senecio nemorensis	15
Mycelis muralis	30	Solidago virgaurea	15
Athyrium filix-femina	27	Carpinus betulus	14
Hedera helix	25	Geranium robertianum	14
Lamiastrum galeobdolon agg.	25	Polygonatum multiflorum	14
Poa nemoralis	25	Sanicula europaea	14
Mercurialis perennis	24	Carex digitata	13
Prenanthes purpurea	24	Daphne mezereum	13
Anemone nemorosa	23	Ilex aquifolium	13
Fraxinus excelsior	23	Brachypodium sylvaticum	12
Luzula luzuloides	23	Lathyrus vernus	12
Viola reichenbachiana	23	Maianthemum bifolium	12
Picea abies	22	Neottia nidus-avis	12
Sorbus aucuparia	22	Quercus petraea agg.	12
Hieracium murorum agg.	21	Acer campestre	11
Abies alba	20	Carex sylvatica	11

Deschampsia flexuosa	20	Epilobium montanum	11
Polytrichum formosum	20	Acer platanoides	10
Dryopteris filix-mas	19	Ajuga reptans	10
Vaccinium myrtillus	18	Hypnum cupressiforme	10
Melica uniflora	17	Lonicera xylosteum	10
Rubus idaeus	17	Paris quadrifolia	10
Milium effusum	16	Prunus avium	10
Cardamine bulbifera	15	Sorbus aria agg.	10
Corylus avellana	15		

G1.7 - Thermophilous deciduous woodland

European Forest Type: 8.1 Downy oak forest, 8.2 Turkey oak, Hungarian oak and Sessile oak forest, 8.3 Pyrenean oak forest, 8.4 Portugese oak and Mirbeck's oak Iberian forest, 8.5 Macedonian oak forest, 8.6 Valonia oak forest, 8.7 Chestnut forest, 8.8 Other thermophilous deciduous forests

Origin of data (countries): AT, BA, BG, CH, CZ, DU, ES, FR, GB, GR, HR, HU, IE, IT, MK, NL, PL, RO, SI, SK, SM, UA

List of alliances: PUB-01C, PUB-02A, PUB-02B, PUB-02C, PUB-02D, PUB-02E, PUB-02F, PUB-02G, PUB-02H, PUB-02I, PUB-02J, PUB-02K, PUB-02L, PUB-02M, PUB-02P, PUB-03B

Additional selection rules: In addition to the relevés belonging to the listed alliances, all relevés with a cover of Quercus pubescens, Q. cerris, Q. trojana, Q. faginea or Q. frainetto > 25% were assigned to this EUNIS type

Implications for EUNIS classification: n/a

Implications for EFT classification: n/a

Floristic composition:

Crataegus monogyna agg.	62	Cruciata glabra	16
Fraxinus ornus	38	Rosa arvensis	16
Brachypodium sylvaticum	37	Viola reichenbachiana	16
Acer campestre	36	Juniperus communis	16
Dactylis glomerata agg.	35	Campanula persicifolia	16
Quercus cerris	34	Rosa canina agg.	15
Ligustrum vulgare	33	Euphorbia cyparissias	15
Quercus pubescens	32	Lathyrus niger	15
Hedera helix	31	Polygonatum odoratum	15
Fragaria vesca	30	Carex flacca	15
Cornus mas	28	Rubus ulmifolius	15
Sorbus torminalis	28	Euphorbia amygdaloides	14
Prunus spinosa	27	Hieracium murorum agg.	14
Poa nemoralis	24	Viola hirta	14
Cornus sanguinea	24	Quercus frainetto	14
Clinopodium vulgare	24	Brachypodium pinnatum subsp. pinnatum	13
Tamus communis	24	Daphne laureola	13
Melica uniflora	23	Sorbus domestica	13
Viola alba	23	Quercus robur	13
Teucrium chamaedrys	23	Lonicera xylosteum	12
Quercus petraea agg.	22	Ajuga reptans	12
Carpinus betulus	22	Hepatica nobilis	12
Festuca heterophylla	22	Potentilla micrantha	12
Vincetoxicum hirundinaria	22	Prunus avium	12

Corylus avellana	22	Asparagus acutifolius	12
Veronica chamaedrys agg.	21	Lathyrus venetus	12
Stachys officinalis	20	Primula vulgaris	12
Ruscus aculeatus	20	Fagus sylvatica	12
Geum urbanum	19	Galium mollugo agg.	12
Ostrya carpinifolia	19	Rhamnus catharticus	12
Viburnum lantana	19	Sorbus aria agg.	12
Buglossoides purpurocaerulea	18	Lonicera etrusca	11
Luzula forsteri	18	Hypericum perforatum	11
Clematis vitalba	18	Brachypodium pinnatum subsp. rupestre	11
Pteridium aquilinum	17	Galium aparine	11
Euonymus europaeus	17	Campanula trachelium	11
Rubia peregrina	17	Genista tinctoria	11
Melittis melissophyllum	17	Mycelis muralis	10
Tanacetum corymbosum	17	Fraxinus excelsior	10

G1.8 - Acidophilous [Quercus]-dominated woodland

European Forest Type: 4.1 Acidophylous oakwood, 4.2 Oak-birch forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, HR, HU, IT, NL, PL, RO, RU, SI, SK

List of alliances: PUB-02B, PUB-02C, PUB-02D, ROB-01A, ROB-01B, ROB-01C, ROB-01D, ROB-01E, ROB-01F, ROB-01G, ROB-01H

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Acidophilous Quercus woodland

Implications for EFT classification: n/a

Floristic composition:

Quercus robur	54	Ilex aquifolium	15
Sorbus aucuparia	51	Anthoxanthum odoratum agg.	15
Deschampsia flexuosa	45	Ceratocapnos claviculata	14
Frangula alnus	36	Hedera helix	14
Dryopteris carthusiana agg.	34	Mnium hornum	14
Rubus fruticosus agg.	32	Crataegus monogyna agg.	14
Betula pendula	32	Poa nemoralis	14
Fagus sylvatica	32	Polygonatum multiflorum	13
Pteridium aquilinum	31	Teucrium scorodonia	13
Lonicera periclymenum	29	Calluna vulgaris	12
Vaccinium myrtillus	26	Maianthemum bifolium	12
Holcus mollis	26	Sambucus nigra	12
Molinia caerulea	25	Stellaria holostea	12
Betula pubescens	24	Quercus rubra	11
Prunus serotina	22	Dicranum scoparium	11
Agrostis capillaris	22	Hypnum cupressiforme	11
Quercus petraea agg.	21	Luzula luzuloides	11
Pinus sylvestris	19	Oxalis acetosella	11
Corylus avellana	19	Hieracium murorum agg.	10
Polytrichum formosum	16	Carpinus betulus	10
Melampyrum pratense	16		

G1.9 - Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

European Forest Type: 3.4 Mountainous birch forest, 13.3 Birch forest, 13.4 Aspen forest

Origin of data (countries): ES, FR, IT, RU

List of alliances: BRA-01B, BRA-01C, FAG-05A, FAG-05B, FAG-05C, FAG-05D, PIC-01G, PIC-01H

Additional selection rules: n/a

Implications for EUNIS classification: G1.9' Mountain betula & Populus tremula woodland on mineral soils, G1.9'' Lowland Continental Betula and Populus tremula woodland on mineral soils

Implications for EFT classification: 3.4 Mountainous birch forest (G1.9'), 13.3 Birch forest (G1.9''), 13.4 Aspen forest (G1.9'')

Floristic composition:

Betula pendula	59	Primula macrocalyx	17
Sorbus aucuparia	56	Urtica dioica	17
Stellaria holostea	51	Oxalis acetosella	17
Fragaria vesca	44	Epilobium angustifolium	16
Vaccinium myrtillus	34	Saxifraga spathularis	16
Pinus sylvestris	33	Heracleum sibiricum	16
Pteridium aquilinum	33	Lathyrus pisiformis	16
Calamagrostis arundinacea	32	Anemone nemorosa	16
Solidago virgaurea	32	Bupleurum longifolium	15
Poa nemoralis	31	Campanula persicifolia	15
Vicia sepium	31	Cirsium helenioides	15
Brachypodium pinnatum subsp. pinnatum	30	Deschampsia flexuosa	15
Galium boreale	30	Euphorbia subcordata	15
Vulpicidia pinastri	30	Orthilia secunda	15
Melica nutans	29	Pleurospermum uralense	15
Hypogymnia physodes	29	Acer pseudoplatanus	15
Lathyrus vernus	29	Melampyrum pratense	14
Corylus avellana	28	Melica uniflora	14
Evernia mesomorpha	28	Tamus communis	14
Parmelia sulcata	28	Crepis sibirica	14
Rubus saxatilis	28	Ligustrum vulgare	14
Viola collina	28	Rosa majalis	14
Lilium martagon	28	Sanionia uncinata	14
Pleurozium schreberi	27	Trollius europaeus	14
Sanguisorba officinalis	27	Blechnum spicant	14
Viola mirabilis	27	Rubus idaeus	13

Crataegus monogyna agg.	26	Salix caprea	13
Geranium sylvaticum	26	Silene nutans	13
Parmeliopsis ambigua	26	Hylocomium splendens	13
Erica arborea	26	Larix sibirica	13
Viola canina	25	Rhodobryum roseum	13
Campanula glomerata	24	Rhytidiadelphus triquetrus	13
Adenophora lilifolia	23	Bistorta officinalis	13
Carex digitata	23	Pyrola minor	12
Hypogymnia tubulosa	23	Mercurialis perennis	12
Lupinaster pentaphyllus	23	Rubus ulmifolius	12
Luzula pilosa	23	Maianthemum bifolium	12
Pseudevernia furfuracea	23	Omphalodes nitida	12
Angelica sylvestris	22	Polystichum setiferum	12
Milium effusum	21	Potentilla erecta	12
Prunus avium	21	Thalictrum minus	12
Pulmonaria mollis	21	Fraxinus excelsior	12
Polygonatum odoratum	20	Primula vulgaris	12
Dactylis glomerata agg.	20	Frangula alnus	11
Veronica chamaedrys agg.	20	Quercus robur	11
Melanelia olivacea	20	Aconogonon alpinum	11
Seseli krylovii	20	Cirsium palustre	11
Trientalis europaea	20	Dicranum scoparium	11
Dryopteris filix-mas	20	Geranium robertianum	11
Hieracium umbellatum	20	Euphorbia dulcis	11
Ilex aquifolium	20	Salix atrocinerea	10
Stachys officinalis	20	Hedera helix	10
Lonicera periclymenum	19	Origanum vulgare	10
Populus tremula	19	Sanicula europaea	10
Aegopodium podagraria	19	Cerastium pauciflorum	10
Teucrium scorodonia	18	Clematis alpina	10
Dryopteris carthusiana agg.	18	Geranium pseudosibiricum	10
Aconitum septentrionale	18	Hypericum maculatum	10
Chamaecytisus ruthenicus	18	Lathyrus pratensis	10
Crepis lampsanoides	18	Poa sibirica	10
Luzula sylvatica	17	Ptilium crista-castrensis	10
Achillea millefolium agg.	17	Ranunculus auricomus	10
Betula pubescens	17	Vicia sylvatica	10
Digitalis grandiflora	17		

G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland

European Forest Type: 5.1 Pedunculate oak-hornbeam forest, 5.2 Sessile oak-hornbeam forest, 5.3 Ashwood and oak-ash forest, 5.4 Maple-oak forest, 5.5 Lime-oak forest, 5.6 Maple-lime forest, 5.7 Lime forest, 5.8 Ravine and slope forest, 5.9 Other mesohpytic deciduous forests

Origin of data (countries): AT, BE, CH, CZ, DE, DU, ES, FR, GB, GR, HR, HU, IE, IT, NL, PL, RO, RU, SE, SI, SK, SM, UA

List of alliances: FAG-02A, FAG-02B, FAG-02C, FAG-02D, FAG-02E, FAG-02F, FAG-02G, FAG-02H, FAG-02I, FAG-02J, FAG-02K, FAG-02L, FAG-02M, FAG-03A, FAG-03C, FAG-03D, FAG-03E, FAG-03F, FAG-03G

Additional selection rules: In addition to the relevés belonging to the listed alliances, all relevés with a cover of Acer pseudoplatanus, Tilia platyphyllos or Ulmus glabra > 50% were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Mesotrophic and eutrophic deciduous woodland, not dominated by Fagus

Implications for EFT classification: n/a

Floristic composition:

Acer pseudoplatanus	47	Melica uniflora	18
Carpinus betulus	45	Ajuga reptans	17
Fraxinus excelsior	44	Campanula trachelium	17
Corylus avellana	44	Carex sylvatica	16
Fagus sylvatica	39	Lonicera xylosteum	16
Crataegus monogyna agg.	39	Galium aparine	15
Lamiastrum galeobdolon agg.	36	Ligustrum vulgare	15
Galium odoratum	35	Euonymus europaeus	14
Poa nemoralis	31	Sanicula europaea	14
Mercurialis perennis	31	Veronica chamaedrys agg.	14
Acer campestre	31	Circaea lutetiana	14
Hedera helix	30	Hepatica nobilis	14
Geranium robertianum	29	Rubus fruticosus agg.	14
Quercus robur	29	Senecio nemorensis	14
Urtica dioica	27	Paris quadrifolia	13
Geum urbanum	27	Hieracium murorum agg.	13
Quercus petraea agg.	27	Impatiens noli-tangere	13
Dryopteris filix-mas	27	Picea abies	13
Polygonatum multiflorum	27	Tilia platyphyllos	13
Viola reichenbachiana	27	Euphorbia amygdaloides	13
Brachypodium sylvaticum	26	Dryopteris carthusiana agg.	13
Oxalis acetosella	26	Convallaria majalis	13

Stellaria holostea	25	Carex digitata	12
Pulmonaria officinalis agg.	24	Actaea spicata	12
Anemone nemorosa	23	Carex pilosa	12
Tilia cordata	23	Galium sylvaticum	12
Lathyrus vernus	22	Moehringia trinervia	12
Sambucus nigra	22	Rubus idaeus	12
Asarum europaeum	22	Glechoma hederacea agg.	12
Prunus avium	22	Stachys sylvatica	11
Mycelis muralis	22	Alliaria petiolata	11
Aegopodium podagraria	21	Cardamine bulbifera	11
Fragaria vesca	21	Scrophularia nodosa	11
Acer platanoides	20	Symphytum tuberosum	10
Ulmus glabra	20	Betula pendula	10
Athyrium filix-femina	20	Daphne mezereum	10
Dactylis glomerata agg.	19	Pteridium aquilinum	10
Sorbus aucuparia	19	Luzula luzuloides	10
Melica nutans	18	Maianthemum bifolium	10
Cornus sanguinea	18	Ranunculus ficaria	10
Milium effusum	18		

G1.B - Non-riverine [Alnus] woodland

European Forest Type: 13.1 Alder forest, 13.2 Italian alder forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, GR, HR, HU, IT, NL, PL, RO, RU, SI, SK

List of alliances: ALN-01A, POP-02A

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Non-riverine Alnus woodland on mineral soil

Implications for EFT classification: n/a

Floristic composition:

Urtica dioica	54	Festuca gigantea	16
Alnus glutinosa	53	Anemone nemorosa	16
Fraxinus excelsior	45	Alnus incana	16
Crataegus monogyna agg.	33	Carex remota	16
Quercus robur	32	Hedera helix	15
Sambucus nigra	32	Caltha palustris	15
Dryopteris carthusiana agg.	32	Brachythecium rutabulum	15
Geum urbanum	30	Galium palustre	15
Glechoma hederacea agg.	30	Iris pseudacorus	15
Deschampsia cespitosa	29	Ajuga reptans	15
Galium aparine	28	Plagiomnium undulatum	14
Acer pseudoplatanus	27	Acer campestre	14
Aegopodium podagraria	27	Moehringia trinervia	13
Rubus caesius	26	Cirsium oleraceum	13
Prunus padus	25	Lamiastrum galeobdolon agg.	12
Athyrium filix-femina	25	Alliaria petiolata	12
Corylus avellana	25	Lonicera periclymenum	12
Stachys sylvatica	23	Eurhynchium praelongum	12
Poa trivialis	22	Mnium hornum	12
Lysimachia vulgaris	22	Fagus sylvatica	12
Ranunculus repens	22	Juncus effusus	12
Geranium robertianum	22	Silene dioica	12
Sorbus aucuparia	22	Phalaris arundinacea	11
Brachypodium sylvaticum	21	Carex sylvatica	11
Filipendula ulmaria	21	Carex acutiformis	11
Circaea lutetiana	20	Lysimachia nummularia	11
Solanum dulcamara	20	Eupatorium cannabinum	11
Euonymus europaeus	19	Chaerophyllum hirsutum	11
Humulus lupulus	19	Myosotis scorpioides agg.	11
Impatiens noli-tangere	19	Paris quadrifolia	10

Cornus sanguinea	19	Lamium maculatum	10
Oxalis acetosella	19	Poa nemoralis	10
Ranunculus ficaria	18	Betula pubescens	10
Angelica sylvestris	18	Calamagrostis canescens	10
Rubus fruticosus agg.	18	Cirsium palustre	10
Rubus idaeus	18	Impatiens parviflora	10
Frangula alnus	17	Picea abies	10
Viburnum opulus	17	Polygonatum multiflorum	10
Lycopus europaeus	17		

G1.C - Highly artificial broadleaved deciduous forestry plantations

European Forest Type: n/a

Origin of data (countries): AT, BE, CH, CZ, DU, FR, GB, IT, NL, RU, SK

List of alliances: RHA-01B, RHA-01C, RHA-01D

Additional selection rules: In addition to the relevés belonging to the listed alliances, relevés with a cover of Quercus rubra, Q. palustris, Populus balsamifera, P. x canadensis, P. candicans, P. deltoides, Fraxinus pennsylvanica or Acer saccharinum > 25% and higher than any other tree species were assigned to EUNIS type

Implications for EUNIS classification: proposed new name: Broadleaved deciduous plantations of non site-native trees

Implications for EFT classification: n/a

Floristic composition:

Urtica dioica	58	Elymus repens	15
Populus x canadensis	56	Holcus lanatus	15
Galium aparine	48	Arrhenatherum elatius	14
Sambucus nigra	43	Prunus padus	14
Rubus fruticosus agg.	37	Taraxacum sect. Ruderalia	14
Crataegus monogyna agg.	29	Chelidonium majus	13
Poa trivialis	29	Geranium robertianum	13
Quercus robur	28	Moehringia trinervia	13
Glechoma hederacea agg.	26	Stellaria media agg.	13
Alnus glutinosa	24	Alliaria petiolata	12
Robinia pseudacacia	24	Heracleum sphondylium	12
Sorbus aucuparia	24	Holcus mollis	12
Rubus caesius	23	Phalaris arundinacea	12
Galeopsis tetrahit	22	Acer pseudoplatanus	11
Geum urbanum	21	Agrostis capillaris	11
Anthriscus sylvestris	20	Euonymus europaeus	11
Fraxinus excelsior	20	Frangula alnus	11
Dactylis glomerata agg.	19	Hedera helix	11
Quercus rubra	19	Impatiens parviflora	11
Humulus lupulus	17	Ranunculus repens	11
Lonicera periclymenum	16	Rosa canina agg.	11
Poa nemoralis	16	Aegopodium podagraria	10
Brachythecium rutabulum	15	Cornus sanguinea	10
Corylus avellana	15	Prunus serotina	10
Dryopteris carthusiana agg.	15		

G1.D - Fruit and nut tree orchards

European Forest Type: n/a

Origin of data (countries): n/a

List of alliances: n/a

Additional selection rules: n/a

Implications for EUNIS classification: G1.D is not a woodland and should be removed, could go into EUNIS group I

Implications for EFT classification: n/a

Floristic composition:
No data

G2.1 - Mediterranean evergreen [Quercus] woodland

European Forest Type: 9.1 Mediterranean evergreen oak forest

Origin of data (countries): ES, FR, GB, GR, HR, IT, MO, SI

List of alliances: QUI-02A, QUI-02D, QUI-03A, QUI-03B, QUI-03C, QUI-03D, QUI-03E, QUI-03F, QUI-03G

Additional selection rules: In addition to the relevés belonging to the listed listed below, all relevés with a cover of Quercus ilex, Q. rotundifolia, Q. coccifera, Q. suber or Q. crenata > 25% were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Mediterranean evergreen Quercus woodland

Implications for EFT classification: n/a

Floristic composition:

Rubia peregrina	66	Phillyrea angustifolia	18
Quercus ilex subsp. Ilex	60	Quercus suber	17
Asparagus acutifolius	44	Juniperus oxycedrus	16
Ruscus aculeatus	40	Asplenium onopteris	16
Smilax aspera	40	Pistacia terebinthus	16
Arbutus unedo	32	Dactylis glomerata agg.	16
Hedera helix	31	Rosa sempervirens	15
Erica arborea	28	Lonicera etrusca	14
Phillyrea latifolia	28	Thymus vulgaris	14
Rubus ulmifolius	28	Osyris alba	14
Quercus coccifera	27	Viburnum tinus	14
Pistacia lentiscus	26	Pinus halepensis	13
Teucrium chamaedrys	26	Euphorbia characias	13
Lonicera implexa	26	Brachypodium retusum	13
Crataegus monogyna agg.	26	Carex distachya	12
Tamus communis	22	Buxus sempervirens	11
Quercus ilex subsp. rotundifolia	21	Cistus albidus	11
Clematis flammula	20	Cistus salvifolius	11
Rhamnus alaternus	20	Rosmarinus officinalis	11
Brachypodium sylvaticum	19	Prunus spinosa	10
Fraxinus ornus	18	Luzula forsteri	10
Carex hallerana	18	Daphne gnidium	10

G2.2 - Eurasian continental sclerophyllous woodland

European Forest Type: 9.5 Other sclerophlyllous forest

Origin of data (countries): ES

List of alliances: QUI-03I

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Mainland lauriphyllous woodland

Implications for EFT classification: n/a

Floristic composition:

Smilax aspera	62	Crataegus monogyna agg.	20
Arbutus unedo	53	Brachypodium pinnatum subsp. rupestre	17
Laurus nobilis	46	Phillyrea latifolia	17
Pteridium aquilinum	45	Rosa sempervirens	17
Rubia peregrina	42	Quercus robur	16
Rubus ulmifolius	42	Polypodium cambricum	15
Ruscus aculeatus	42	Prunus lusitanica subsp. lusitanica	15
Lonicera periclymenum	39	Parietaria judaica	14
Asplenium onopteris	38	Quercus faginea	13
Tamus communis	34	Arum italicum	13
Erica arborea	33	Daboecia cantabrica	13
Hedera maroccana	32	Polystichum setiferum	12
Hedera helix	29	Cistus salvifolius	11
Teucrium scorodonia	27	Genista hispanica	11
Rhamnus alaternus	24	Iris foetidissima	11
Viburnum tinus	23	Quercus ilex subsp. rotundifolia	11

G2.3 - Macaronesian [Laurus] woodland

European Forest Type: 9.4 Macaronesian laurisilva

Origin of data (countries): ES

List of alliances: AZO-01A, AZO-02A, AZO-02B, LAU-02A, LAU-02B, LAU-02C

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Macaronesian lauriphyllous woodland

Implications for EFT classification: n/a

Floristic composition:

Myrica faya	56	Rubus ulmifolius	20
Asplenium onopteris	43	Prunus lusitanica subsp. hixa	19
Dryopteris oligodonta	42	Pteris incompleta	19
Erica arborea	40	Cedronella canariensis	18
Persea indica	36	Heberdenia excelsa	18
Pteridium aquilinum	36	Polystichum setiferum	18
Viburnum tinus	36	Laurus azorica	17
Ilex canariensis	31	Davallia canariensis	16
Phyllis nobla	31	Rhamnus glandulosa	16
Galium scabrum	29	Blechnum spicant	16
Diplazium caudatum	28	Pericallis appendiculatus	15
Rubia peregrina	28	Rubus bollei	15
Woodwardia radicans	28	Picconia excelsa	14
Hypericum grandifolium	25	Ranunculus cortusifolius	14
Ocotea foetens	25	Semele androgyna	12
Brachypodium sylvaticum	23	Asplenium hemionitis	11
Sibthorpia peregrina	21	Erica scoparia	11
Eupatorium adenophorum	20	Urtica morifolia	11
Ilex perado	20	Cystopteris viridula	10
Ixanthus viscosus	20	Myosotis latifolia	10

G2.4 - [Olea europaea] - [Ceratonia siliqua] woodland

European Forest Type: 9.2 Olive-carob forest

Origin of data (countries): ES, FR, GR, IT

List of alliances: QUI-01A, QUI-02B

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Olea oleaster-Ceratonia siliqua woodland

Implications for EFT classification: n/a

Floristic composition:

Pistacia lentiscus	81	Cistus salvifolius	16
Asparagus acutifolius	43	Pistacia terebinthus	16
Smilax aspera	40	Euphorbia dendroides	14
Olea europaea agg.	39	Juniperus oxycedrus	14
Brachypodium retusum	37	Rosmarinus officinalis	14
Pinus halepensis	35	Arbutus unedo	14
Rubia peregrina	30	Piptatherum miliaceum	13
Arisarum vulgare	29	Juniperus phoenicea	13
Quercus coccifera	28	Geranium purpureum	12
Dactylis glomerata agg.	24	Quercus ilex subsp. ilex	12
Urginea maritima	23	Thymus vulgaris	12
Myrtus communis	22	Piptatherum coerulescens	12
Rhamnus alaternus	22	Calicotome villosa	11
Lonicera implexa	20	Euphorbia spinosa	11
Phillyrea latifolia	20	Psoralea bituminosa	11
Prasium majus	18	Asphodelus ramosus	11
Cistus incanus subsp. creticus	18	Galium rubrum	10
Clematis flammula	18	Trifolium campestre	10
Ceratonia siliqua	17		

G2.5 - [Phoenix] groves

European Forest Type: 9.3 Palm groves

Origin of data (countries): GR

List of alliances: NER-01F, OLE-01C

Additional selection rules: In addition the relevés of alliance OLE-01C, relevés with a cover of Phoenix canariensis > 5% were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Phoenix groves

Implications for EFT classification: n/a

Floristic composition:

Phoenix theophrasti	100	Anthyllis hermanniae	14
Arisarum vulgare	35	Arum concinnatum	14
Leontodon tuberosus	35	Asparagus acutifolius	14
Nerium oleander	35	Asperula rigida	14
Pistacia lentiscus	35	Asphodeline lutea	14
Reichardia picroides	35	Asphodelus ramosus	14
Tordylium apulum	35	Brachypodium distachyon	14
Urginea maritima	35	Brassica cretica	14
Anagallis arvensis	28	Bromus fasciculatus	14
Anthemis chia	28	Bromus madritensis	14
Asparagus aphyllus	28	Carlina corymbosa	14
Ceratonia siliqua	28	Crucianella latifolia	14
Geranium purpureum	28	Cynodon dactylon	14
Oxalis pes-caprae	28	Daucus involucratus	14
Parietaria cretica	28	Desmazeria rigida	14
Petromarula pinnata	28	Erica manipuliflora	14
Satureja thymbra	28	Euphorbia dendroides	14
Silene sedoides	28	Galium aparine	14
Smilax aspera	28	Galium graecum	14
Ballota pseudodictamnus	21	Genista acanthoclada	14
Brachypodium retusum	21	Lavatera bryoniifolia	14
Capparis spinosa	21	Medicago coronata	14
Centaurea redempta	21	Muscari comosum	14
Ficus carica	21	Orlaya kochii	14
Malcolmia flexuosa	21	Phagnalon graecum	14
Myrtus communis	21	Prasium majus	14
Phlomis lanata	21	Spartium junceum	14
Piptatherum coerulescens	21	Tamus communis	14
Piptatherum miliaceum	21	Teucrium microphyllum	14
Psoralea bituminosa	21	Thesium humile	14
Rostraria cristata	21	Thymelaea tartonraira subsp. argentea	14

Sarcopoterium spinosum	21	Torilis nodosa	14
Theligonum cynocrambe	21	Trifolium campestre	14
Urospermum picroides	21	Trifolium stellatum	14
Valantia muralis	21	Urtica pilulifera	14
Vitex agnus-castus	21	Valantia hispida	14
Aetheorhiza bulbosa	14	Viola scorpiuroides	14
Allium rubrovittatum	14		

G2.6 - [Ilex aquifolium] woods

European Forest Type: 9.5 Other sclerophlyllous forest

Origin of data (countries): AT, BE, CH, DU, ES, FR, GB, GR, IE, IT, NL

List of alliances: FAG-01I, FAG-02A, FAG-02B, QUI-03D, ROB-01B, ROB-01C, ROB-02A

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Ilex aquifolium woodland

Implications for EFT classification: n/a

Floristic composition:

Ilex aquifolium	100	Isothecium myosuroides	14
Hedera helix	64	Rubus fruticosus agg.	14
Pteridium aquilinum	49	Blechnum spicant	13
Fagus sylvatica	48	Leucobryum glaucum	13
Lonicera periclymenum	48	Rosa canina agg.	13
Quercus petraea agg.	30	Thuidium tamariscinum	13
Crataegus monogyna agg.	29	Acer campestre	12
Corylus avellana	28	Betula pubescens	12
Polytrichum formosum	28	Oxalis acetosella	12
Deschampsia flexuosa	27	Ruscus aculeatus	12
Fraxinus excelsior	24	Castanea sativa	11
Sorbus aucuparia	21	Hypnum cupressiforme	11
Vaccinium myrtillus	21	Acer pseudoplatanus	10
Dicranum scoparium	19	Frangula alnus	10
Carpinus betulus	17	Luzula sylvatica	10
Mnium hornum	16	Sambucus nigra	10
Prunus spinosa	16	Teucrium scorodonia	10
Dryopteris carthusiana agg.	15		

G2.7 - Canary Island heath woodland

European Forest Type: 9.5 Other sclerophlyllous forest

Origin of data (countries): ES

List of alliances: LAU-01A, LAU-01B, LAU-01C, LAU-01D, LAU-01E

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Macaronesion heathy woodland

Implications for EFT classification: n/a

Floristic composition:

Erica arborea	64	Teline canariensis	18
Myrica faya	50	Teline microphylla	18
Ilex canariensis	46	Davallia canariensis	15
Laurus azorica	41	Phyllis nobla	15
Asplenium onopteris	33	Cedronella canariensis	14
Pteridium aquilinum	32	Picconia excelsa	14
Brachypodium sylvaticum	30	Hypericum grandifolium	13
Dryopteris oligodonta	24	Micromeria benthamii	13
Rubus ulmifolius	23	Adenocarpus foliolosus	12
Galium scabrum	22	Myosotis latifolia	12
Viburnum tinus	20		

G2.8 - Highly artificial broadleaved evergreen forestry plantations

European Forest Type: n/a

Origin of data (countries): n/a

List of alliances: n/a

Additional selection rules: n/a

Implications for EUNIS classification: proposed new name: Broadleaved evergreen plantations of non site-native trees

Implications for EFT classification: n/a

Floristic composition:
No data

G2.9 - Evergreen orchards and groves

European Forest Type: n/a

Origin of data (countries): n/a

List of alliances: n/a

Additional selection rules: n/a

Implications for EUNIS classification: G2.9 is not a woodland and should be removed, could go into EUNIS group I

Implications for EFT classification: n/a

Floristic composition:
No data

G3.1 - [Abies] and [Picea] woodland

European Forest Type: 2.3 Nemoral spruce forest, 3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest, 2.8 Nemoral Silver fir forest, 7.9 Mountainous Silver fir forest, 10.6 Mediterranean and Anatolian fir forest

Origin of data (countries): AT, BE, BG, CH, CZ, DU, ES, FR, GB, GR, HR, IE, IT, NL, PL, SI, SK, XK, YU

List of alliances: FAG-01E, FAG-01F, FAG-01G, FAG-01I, FAG-01J, FAG-01K, FAG-04A, PIC-01A, PIC-01B, PIC-01C, PIC-01E, PIC-04A, PUB-02N, PUB-02O, ROB-02A, ROB-02C

Additional selection rules: Instead of the relevés belonging to the listed alliances listed below, relevés with a cover of Picea abies, P. omorika, Abies alba, A. pinsapo, A. nebrodensis, A. cephalonica, A. sibirica, A. nordmanniana or A. borisii-regis > 25% and at the same time higher than any other tree species were assigned to this category; in addition, relevés with Picea abies from Norway, Sweden, Finland, Estonia and Russia were removed

Implications for EUNIS classification: G3.1' Temperate mountain Picea woodland, G3.1'' Temperate mountain Abies woodland, G3.1''' Mediterranean mountain Abies woodland

Implications for EFT classification: 2.3 Nemoral spruce forest (G3.1'), 3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest (G3.1'), 2.8 Nemoral Silver fir forest (G3.1''), 7.9 Mountainous Silver fir forest (G3.1'''), 10.6 Mediterranean and Anatolian fir forest (G3.1''')

Floristic composition:

Picea abies	84	Paris quadrifolia	15
Oxalis acetosella	67	Phyteuma spicatum	15
Vaccinium myrtillus	60	Polygonatum verticillatum	15
Sorbus aucuparia	55	Viola reichenbachiana	15
Abies alba	54	Ajuga reptans	14
Fagus sylvatica	49	Corylus avellana	14
Dicranum scoparium	40	Epilobium montanum	14
Hieracium murorum agg.	39	Gymnocarpium dryopteris	14
Polytrichum formosum	39	Melampyrum sylvaticum	14
Athyrium filix-femina	38	Sanicula europaea	14
Deschampsia flexuosa	37	Galium rotundifolium	13
Dryopteris carthusiana agg.	36	Geranium robertianum	13
Prenanthes purpurea	36	Lonicera nigra	13
Acer pseudoplatanus	33	Melica nutans	13
Rubus idaeus	31	Rhytidiadelphus loreus	13
Fragaria vesca	28	Veronica officinalis	13
Maianthemum bifolium	27	Calamagrostis varia	12
Hylocomium splendens	26	Fraxinus excelsior	12
Mycelis muralis	26	Gentiana asclepiadea	12

Senecio nemorensis	26	Lamiastrum galeobdolon agg.	12
Solidago virgaurea	25	Larix decidua	12
Homogyne alpina	23	Rhytidiadelphus triquetrus	12
Luzula sylvatica	22	Bazzania trilobata	11
Luzula luzuloides	21	Ctenidium molluscum	11
Mercurialis perennis	20	Adenostyles alpina subsp. alpina	10
Galium odoratum	19	Anemone nemorosa	10
Calamagrostis villosa	18	Blechnum spicant	10
Dryopteris filix-mas	18	Brachypodium sylvaticum	10
Pleurozium schreberi	18	Lycopodium annotinum	10
Luzula pilosa	17	Pinus sylvestris	10
Vaccinium vitis-idaea	16	Rosa pendulina	10
Carex digitata	15	Sambucus racemosa	10
Daphne mezereum	15	Valeriana tripteris	10
Hypnum cupressiforme	15		

G3.2 - Alpine [Larix] - [Pinus cembra] woodland

European Forest Type: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Origin of data (countries): AT, CH, CZ, DU, FR, GB, IE, IT, NL, PL, SI, SK

List of alliances: ERI-01A, PIC-01A

Additional selection rules: Instead of the relevés belonging to the listed alliances, relevés with a cover of Larix decidua or Pinus cembra > 15% and at the same time higher than any other tree species were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Temperate subalpine Larix-Pinus woodland

Implications for EFT classification: n/a

Floristic composition:

Larix decidua	93	Pinus mugo	14
Vaccinium myrtillus	56	Rhytidiadelphus triquetrus	14
Sorbus aucuparia	49	Rubus saxatilis	14
Picea abies	43	Acer pseudoplatanus	13
Homogyne alpina	41	Adenostyles alpina subsp. alpina	13
Deschampsia flexuosa	39	Fagus sylvatica	13
Hieracium murorum agg.	37	Lonicera alpigena	13
Oxalis acetosella	35	Luzula nivea	13
Geranium sylvaticum	34	Phyteuma orbiculare	13
Vaccinium vitis-idaea	34	Prenanthes purpurea	13
Pinus cembra	28	Rumex alpestris	13
Juniperus communis	27	Adenostyles alliariae	12
Melampyrum sylvaticum	25	Asplenium viride	12
Solidago virgaurea	24	Erica herbacea	12
Valeriana tripteris	24	Leontodon hispidus	12
Chaerophyllum hirsutum	23	Melica nutans	12
Luzula sylvatica	23	Ranunculus oreophilus	12
Veratrum album	23	Saxifraga rotundifolia	12
Anthoxanthum odoratum agg.	22	Veronica chamaedrys agg.	12
Daphne mezereum	21	Athyrium filix-femina	11
Campanula scheuchzeri	20	Huperzia selago	11
Dicranum scoparium	20	Lycopodium annotinum	11
Hylocomium splendens	20	Myosotis sylvatica	11
Viola biflora	20	Polystichum lonchitis	11
Festuca flavescens	19	Pulsatilla alpina	11
Fragaria vesca	19	Senecio nemorensis	11
Rosa pendulina	19	Sorbus chamaemespilus	11
Rubus idaeus	19	Tortella tortuosa	11
Abies alba	18	Vaccinium uliginosum	11

Aster bellidiastrum	18	Achillea millefolium agg.	10
Calamagrostis villosa	18	Carduus defloratus agg.	10
Lotus corniculatus	17	Carex ferruginea	10
Rhododendron hirsutum	17	Ctenidium molluscum	10
Soldanella alpina	17	Lilium martagon	10
Calamagrostis varia	16	Maianthemum bifolium	10
Clematis alpina	16	Peucedanum ostruthium	10
Dryopteris carthusiana agg.	16	Pleurozium schreberi	10
Poa alpina	16	Polytrichum formosum	10
Hieracium prenanthoides	15	Trifolium pratense	10
Poa nemoralis	15		

G3.3 - [Pinus uncinata] woodland

European Forest Type: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Origin of data (countries): AT, DU, IT, SK

List of alliances: ERI-01A, PIC-01A, PIC-01D

Additional selection rules: Instead of the relevés belonging to the listed alliances, relevés with a cover of Pinus uncinata > 15% and at the same time higher than any other tree species were assigned to this EUNIS type

Implications for EUNIS classification: G3.3 [Pinus uncinata] woodland should be merged into G3.2 [Alpine [Larix] - [Pinus cembra] woodland] (this category corresponds to the same phytosociological units, with Pinus species as the usual dominant)]

Implications for EFT classification: n/a

Floristic composition:

Pinus uncinata var. uncinata	100	Carex sempervirens	20
Vaccinium myrtillus	81	Daphne striata	20
Sesleria caerulea	74	Pinus sylvestris	20
Vaccinium vitis-idaea	72	Rhododendron ferrugineum	20
Erica herbacea	70	Selaginella selaginoides	20
Rubus saxatilis	70	Thymus praecox agg.	20
Sorbus aucuparia	70	Adenostyles alpina subsp. alpina	18
Homogyne alpina	69	Bazzania trilobata	18
Hylocomium splendens	65	Campanula scheuchzeri	18
Calamagrostis varia	61	Daphne mezereum	18
Polygala chamaebuxus	61	Globularia nudicaulis	18
Sorbus chamaemespilus	60	Gymnadenia conopsea	18
Picea abies	58	Gymnocarpium dryopteris	18
Potentilla erecta	58	Lilium martagon	18
Calluna vulgaris	56	Petasites paradoxus	18
Pleurozium schreberi	54	Vaccinium uliginosum	18
Valeriana tripteris	54	Biscutella laevigata	16
Rosa pendulina	52	Cetraria islandica	16
Rhododendron hirsutum	50	Convallaria majalis	16
Dicranum scoparium	49	Dactylorhiza maculata agg.	16
Hieracium murorum agg.	49	Dicranum polysetum	16
Juniperus communis	49	Geranium sylvaticum	16
Carex alba	47	Larix decidua	16
Carex flacca	47	Laserpitium latifolium	16
Melica nutans	47	Listera ovata	16
Prenanthes purpurea	47	Oreopteris limbosperma	16
Rhytidiadelphus triquetrus	47	Abies alba	14
Solidago virgaurea	45	Campanula rotundifolia agg.	14

Tofieldia calyculata	45	Carlina acaulis	14
Melampyrum pratense	43	Gymnadenia odoratissima	14
Acer pseudoplatanus	41	Leontodon hispidus	14
Amelanchier ovalis	41	Parnassia palustris	14
Knautia maxima	41	Plagiochila asplenioides	14
Lycopodium annotinum	40	Scabiosa lucida	14
Sphagnum quinquefarium	40	Valeriana saxatilis	14
Calamagrostis villosa	38	Arctostaphylos alpinus	12
Sorbus aria agg.	38	Brachypodium pinnatum subsp. pinnatum	12
Buphthalmum salicifolium	32	Campanula cochlearifolia	12
Carex digitata	32	Centaurea montana	12
Carex montana	32	Ctenidium molluscum	12
Lotus corniculatus	32	Deschampsia flexuosa	12
Molinia caerulea	32	Euphrasia salisburgensis	12
Oxalis acetosella	32	Galium boreale	12
Valeriana montana	32	Luzula sylvatica	12
Maianthemum bifolium	30	Polytrichum formosum	12
Phyteuma orbiculare	30	Sphagnum capillifolium	12
Ranunculus serpens	30	Veronica urticifolia	12
Epipactis atrorubens	29	Viola reichenbachiana	12
Tortella tortuosa	29	Aquilegia atrata	10
Fragaria vesca	27	Cladonia arbuscula	10
Pinus mugo	27	Dryas octopetala	10
Ptilium crista-castrensis	27	Fagus sylvatica	10
Thesium alpinum	27	Globularia cordifolia	10
Carduus defloratus agg.	26	Goodyera repens	10
Aster bellidiastrum	25	Hieracium bifidum	10
Huperzia selago	25	Linum catharticum	10
Melampyrum sylvaticum	25	Listera cordata	10
Carex ferruginea	23	Peucedanum ostruthium	10
Cladonia rangiferina	23	Plagiothecium undulatum	10
Galium anisophyllon	23	Platanthera bifolia	10
Prunella grandiflora	23	Ptilidium ciliare	10
Polygonatum verticillatum	21	Tritomaria quinquedentata	10

G3.4 - [Pinus sylvestris] woodland south of the taiga

European Forest Type: 2.2 Nemoral Scots pine forest, 3.3 AlpineScots pine and Black pine forest, 10.4 Mediterranean and Anatolian Scots pine forest

Origin of data (countries): AT, CZ, DE, ES, FR, GB, GR, HR, IT, NL, PL, RU, SI, SK, UA

List of alliances: BRA-01A, BRA-01B, BRA-01C, ERI-01A, ERI-01B, ERI-01D, ERI-02B, PIC-02A, PYR-01A, PYR-02A, SAB-01A, SAB-01C, SAB-01D, SAB-02A

Additional selection rules: n/a

Implications for EUNIS classification: G3.4' Temperate Continental Pinus sylvestris woodland, G3.4'' Temperate and sub-mediterranean montane Pinus-sylvestris-Pinis nigra woodland

Implications for EFT classification: 2.2 Nemoral Scots pine forest 2.4 Nemoral Black pine forest (G3.4'), 3.3 Alpine Scots pine & black pine forest (G3.4'')

Floristic composition:

Pinus sylvestris	82	Pteridium aquilinum	15
Deschampsia flexuosa	44	Hypnum cupressiforme	14
Sorbus aucuparia	42	Euphorbia cyparissias	14
Vaccinium myrtillus	41	Carex humilis	13
Pleurozium schreberi	39	Melica nutans	13
Betula pendula	36	Buphthalmum salicifolium	13
Quercus robur	32	Calamagrostis varia	13
Dryopteris carthusiana agg.	30	Dicranum polysetum	13
Picea abies	27	Luzula pilosa	13
Frangula alnus	27	Epipactis atrorubens	12
Dicranum scoparium	23	Polygonatum odoratum	12
Calluna vulgaris	23	Berberis vulgaris	12
Juniperus communis	22	Rhytidiadelphus triquetrus	12
Vaccinium vitis-idaea	21	Rubus fruticosus agg.	12
Fragaria vesca	20	Rubus saxatilis	11
Amelanchier ovalis	20	Betula pubescens	11
Hieracium murorum agg.	18	Polytrichum formosum	11
Erica herbacea	18	Prunus serotina	11
Fagus sylvatica	18	Teucrium chamaedrys	11
Melampyrum pratense	18	Vincetoxicum hirundinaria	11
Polygala chamaebuxus	18	Potentilla erecta	10
Hylocomium splendens	17	Lotus corniculatus	10
Sesleria caerulea	17	Anthericum ramosum	10
Molinia caerulea	16	Galium boreale	10
Solidago virgaurea	16	Viola collina	10
Sorbus aria agg.	15		

G3.5 - [Pinus nigra] woodland

European Forest Type: 2.4 Nemoral Black pine forest, 10.2 Mediterranean and Anatolian Black pine forest

Origin of data (countries): AT, BA, CZ, DU, GB, GR, HR, IE, IT, NL, SI, SK, UA

List of alliances: ERI-01A, ERI-01C, ERI-01D, ERI-01F, ERI-02A, PUB-02N, PUB-03A, SAB-01A, SAB-01B, SAB-04A, SAB-04D

Additional selection rules: Instead of the relevés belonging to the listed alliances, relevés with a cover of Pinus nigra (including all its subspecies) > 15% and at the same time higher than any other tree species were assigned to this EUNIS type

Implications for EUNIS classification: G3.4''' Mediterranean-montane Pinus sylvestris-Pinus nigra woodland, ??G3.5 [Pinus nigra] woodland should to be merged into the G3.4'' and G3.4''' types

Implications for EFT classification: 10.2 Mediterranean and Anatolian Black pine forest 10.4 Mediterranean and Anatolian Scots pine forest (G3.4''')

Floristic composition:

Pinus nigra	96	Lotus corniculatus	16
Amelanchier ovalis	38	Teucrium montanum	16
Polygala chamaebuxus	38	Phyteuma orbiculare	15
Sorbus aria agg.	37	Thalictrum minus	15
Sesleria caerulea	36	Asperula cynanchica	14
Carex humilis	31	Dactylis glomerata agg.	14
Teucrium chamaedrys	30	Dorycnium pentaphyllum agg.	14
Erica herbacea	29	Fraxinus excelsior	14
Anthericum ramosum	26	Quercus petraea agg.	14
Cyclamen purpurascens	26	Pimpinella saxifraga	13
Euphorbia cyparissias	25	Rhamnus saxatilis	13
Brachypodium sylvaticum	22	Daphne cneorum	12
Acer pseudoplatanus	21	Genista pilosa	12
Calamagrostis varia	21	Picea abies	12
Fagus sylvatica	21	Pinus sylvestris	12
Vincetoxicum hirundinaria	21	Sorbus aucuparia	12
Berberis vulgaris	20	Viola hirta	12
Buphthalmum salicifolium	20	Carex alba	11
Crataegus monogyna agg.	20	Juniperus oxycedrus	11
Hieracium murorum agg.	20	Ligustrum vulgare	11
Ostrya carpinifolia	20	Melica nutans	11
Fragaria vesca	19	Peucedanum oreoselinum	11
Fraxinus ornus	19	Thymus praecox agg.	11
Galium lucidum	19	Cornus mas	10
Polygonatum odoratum	18	Hieracium bifidum	10

Quercus pubescens	18	Hypnum cupressiforme	10
Cotoneaster tomentosus	17	Juniperus communis	10
Pteridium aquilinum	17	Laserpitium siler	10
Brachypodium pinnatum subsp. pinnatum	16	Tortella tortuosa	10
Globularia cordifolia	16	Viburnum lantana	10
Leontodon incanus	16		

G3.6 - Subalpine mediterranean [Pinus] woodland

European Forest Type: 10.5 Alti-Mediterranean pine forest

Origin of data (countries): BA, GR, ME, XK

List of alliances: ERI-01E, PIC-01F

Additional selection rules: In addition to the relevés belonging to the listed alliances, relevés with a cover of Pinus heldreichii or P. peuce > 15% and at the same time higher than any other tree species were assigned to EUNIS type

Implications for EUNIS classification: proposed new name: Mediterranean and Balkan subalpine Pinus heldreichii-peucis woodland

Implications for EFT classification: n/a

Floristic composition:

Pinus heldreichii	93	Myosotis sylvatica	15
Juniperus communis	58	Rhamnus alpinus subsp. fallax	15
Fragaria vesca	50	Teucrium chamaedrys	15
Euphorbia amygdaloides	45	Dorycnium pentaphyllum agg.	14
Vaccinium myrtillus	39	Euphorbia cyparissias	14
Aremonia agrimonoides	37	Fraxinus ornus	14
Fagus sylvatica	37	Leucanthemum vulgare agg.	14
Brachypodium pinnatum subsp. pinnatum	32	Luzula sylvatica	14
Acinos alpinus	29	Brachypodium sylvaticum	13
Stachys officinalis	28	Lotus corniculatus	13
Thymus praecox agg.	27	Potentilla australis	13
Anemone nemorosa	24	Senecio rupestris	13
Galium lucidum	24	Sesleria robusta	13
Valeriana montana	24	Veratrum album	13
Abies alba	23	Anthoxanthum odoratum agg.	12
Erica herbacea	22	Cerastium decalvans	12
Cotoneaster tomentosus	21	Gentiana asclepiadea	12
Daphne mezereum	21	Sesleria autumnalis	12
Hieracium murorum agg.	21	Tanacetum corymbosum	12
Scabiosa cinerea subsp. cinerea	21	Buphthalmum salicifolium	11
Mycelis muralis	20	Campanula glomerata	11
Primula veris	20	Cyclamen purpurascens	11
Rosa pendulina	20	Daphne blagayana	11
Scabiosa columbaria	20	Galium rotundifolium	11
Veronica officinalis	20	Knautia drymeia	11
Festuca heterophylla	19	Linum capitatum	11
Asperula aristata	18	Peucedanum oreoselinum	11
Pinus peuce	18	Satureja montana subsp. illyrica	11
Sesleria tenuifolia	18	Trifolium repens	11

Viola reichenbachiana	18	Amphoricarpos neumayeri	10
Luzula luzulina	17	Asplenium trichomanes	10
Ostrya carpinifolia	17	Cephalanthera rubra	10
Picea abies	17	Clinopodium vulgare	10
Pinus nigra	17	Digitalis grandiflora	10
Veronica chamaedrys agg.	17	Minuartia baldaccii	10
Buxus sempervirens	16	Polygala alpestris subsp. croatica	10
Daphne oleoides	16	Polystichum lonchitis	10
Gentiana clusii	16	Potentilla crantzii	10
Globularia cordifolia	16	Potentilla micrantha	10
Hieracium hoppeanum	16	Senecio thapsoides subsp. visianianus	10
Teucrium montanum	16	Stachys scardica	10
Thalictrum minus	16	Verbascum nicolai	10

G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])

European Forest Type: 2.7 Atlantic Maritime pine forest, 10.1 Mediterranean pine forest

Origin of data (countries): BE, ES, FR, GB, GR, IT, MO, NL

List of alliances: QUI-01A, QUI-01G, QUI-02B, QUI-02E, QUI-03D, QUI-03H, SAB-04A

Additional selection rules: Instead of the relevés belonging to the listed alliances, relevés with a cover of Pinus pinaster, P. pinea, P. halepensis (including its subspecies) > 15% and at the same time higher than any other tree species were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Mediterranean lowland to submontane Pinus woodland

Implications for EFT classification: n/a

Floristic composition:

Pinus halepensis	62	Galium rubrum	17
Rubia peregrina	59	Pistacia terebinthus	17
Quercus ilex subsp. ilex	45	Staehelina dubia	17
Pistacia lentiscus	43	Crataegus monogyna agg.	16
Dactylis glomerata agg.	42	Odontites luteus	16
Thymus vulgaris	41	Teucrium montanum	16
Smilax aspera	38	Daphne gnidium	15
Juniperus oxycedrus	37	Genista hispanica	15
Pinus pinaster	37	Myrtus communis	15
Asparagus acutifolius	36	Arisarum vulgare	14
Lonicera implexa	34	Asperula cynanchica	14
Rhamnus alaternus	31	Centranthus ruber	14
Rosmarinus officinalis	30	Cephalaria leucantha	14
Phillyrea angustifolia	29	Argyrolobium zanonii	13
Teucrium chamaedrys	28	Catananche caerulea	13
Clematis flammula	26	Reichardia picroides	13
Ononis minutissima	25	Calluna vulgaris	12
Hedera helix	22	Coriaria myrtifolia	12
Arbutus unedo	21	Knautia purpurea	12
Carex hallerana	21	Ononis spinosa	12
Quercus coccifera	21	Cistus monspeliensis	11
Rubus ulmifolius	21	Coris monspeliensis	11
Cistus albidus	20	Echinops ritro	11
Psoralea bituminosa	20	Onobrychis supina	11
Hieracium pilosella	19	Pteridium aquilinum	11
Sanguisorba minor	19	Sorbus domestica	11
Bromus erectus	18	Fumana thymifolia	10

Coronilla minima	18	Galium mollugo agg.	10
Erica arborea	18	Helianthemum oelandicum subsp. italicum	10
Euphorbia spinosa	18	Leuzea conifera	10
Spartium junceum	18	Ranunculus bulbosus	10
Daucus carota	17	Ruscus aculeatus	10
Eryngium campestre	17	Thesium divaricatum	10

G3.8 - Canary Island [Pinus canariensis] woodland

European Forest Type: 10.3 Canarian pine forest

Origin of data (countries): ES

List of alliances: CAN-01A

Additional selection rules: In addition to the relevés belonging to listed alliance, relevés with a cover of Pinus canariensis > 15% and at the same time higher than any other tree species were assigned to this EUNIS type

Implications for EUNIS classification: proposed new name: Pinus canariensis woodland

Implications for EFT classification: n/a

Floristic composition:

Pinus canariensis	100	Myrica faya	16
Asphodelus gracilis	30	Lotus campylocladus	15
Erica arborea	30	Pterocephalus lasiospermus	12
Cistus monspeliensis	28	Micromeria benthamii	10
Cistus symphytifolius	26	Scrophularia glabrata	10

G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]

European Forest Type: 10.7 Juniper forest, 10.8 Cypress forest, 10.9 Cedar forest, 10.10 Tetraclinis articulata stands, 10.11 Mediterranean yew stands

Origin of data (countries): AT, BA, BG, CH, CZ, DU, ES, FI, FR, GB, GR, HR, IE, IT, NL, NO, PL, RO, RU, SI, SK, SM, UA, XK

List of alliances: AZO-01A, CAN-01B, FAG-01C, FAG-02A, FAG-03C, OLE-01A, QUI-01F, QUI-02C, SAB-01B, SAB-04B, SAB-04C, SAB-04D

Additional selection rules: Relevés belonging to alliance FAG-02A were not included

Implications for EUNIS classification: G3.9' Taxus baccata woodland, G3.9' Mediterranean Cupressaceae woodland, G3.9''' Macaronesian Juniperus woodland

Implications for EFT classification: 10.11 Mediterranean yew stands (G3.9'), 10.7 Juniper forest (some) (G3.9'), 10.8 Cypress forest (G3.9'), 10.9 Cedar forest (G3.9'), 10.10 Tetrac (G3.9'), 10.7 Juniper forest (some) (G3.9''')

Floristic composition:

Juniperus communis	57	Vaccinium myrtillus	13
Rubia peregrina	15	Pistacia lentiscus	11
Deschampsia flexuosa	14	Crataegus monogyna agg.	11
Calluna vulgaris	14	Lotus corniculatus	10
Brachypodium pinnatum subsp. pinnatum	14	Pinus sylvestris	10
Teucrium chamaedrys	13	Juniperus oxycedrus	10
Juniperus phoenicea	13	Ligustrum vulgare	10

G3.A - [Picea] taiga woodland

European Forest Type: 1.1 Spruce and spruce-birch boreal forest

Origin of data (countries): FI

List of alliances: PIC-01A, PIC-03A, PIC-05A

Additional selection rules: From alliance PIC-01A, only relevés from Norway, Sweden, Finland, Estonia and Russia north of 57°N were selected

Implications for EUNIS classification: proposed new name: Picea taiga woodland

Implications for EFT classification: n/a

Floristic composition:

Picea abies	100	Cladonia rangiferina	21
Vaccinium myrtillus	91	Lycopodium annotinum	21
Juniperus communis	87	Solidago virgaurea	21
Vaccinium vitis-idaea	87	Dicranum drummondii	19
Betula pubescens	76	Cetraria islandica	17
Pleurozium schreberi	76	Linnaea borealis	17
Pinus sylvestris	65	Polytrichum commune	17
Deschampsia flexuosa	63	Betula nana	14
Hylocomium splendens	57	Cladonia bellidiflora	14
Vaccinium uliginosum	51	Cladonia deformis	14
Empetrum nigrum agg.	48	Cladonia ecmocyna	14
Dicranum fuscescens	46	Populus tremula	14
Calluna vulgaris	38	Trientalis europaea	14
Cladonia arbuscula	38	Carex globularis	12
Barbilophozia lycopodioides	36	Cornus suecica	12
Dicranum majus	31	Diphasiastrum complanatum	12
Maianthemum bifolium	29	Cladonia uncialis	10
Sorbus aucuparia	29	Diphasiastrum alpinum	10
Melampyrum pratense	27	Melampyrum sylvaticum	10

G3.B - [Pinus] taiga woodland

European Forest Type: 1.2 Pine and pine-birch boreal forest

Origin of data (countries): FI

List of alliances: PIC-02A, PIC-02B

Additional selection rules: From alliance PIC-02A, only relevés from Norway, Sweden, Finland, Estonia and Russia north of 57°N were selected

Implications for EUNIS classification: proposed new name: Pinus sylvestris taiga woodland

Implications for EFT classification: n/a

Floristic composition:

Empetrum nigrum agg.	101	Cladonia uncialis	18
Pinus sylvestris	100	Juniperus communis	15
Vaccinium vitis-idaea	90	Arctostaphylos alpinus	13
Vaccinium myrtillus	61	Betula nana	13
Deschampsia flexuosa	52	Cladonia bellidiflora	13
Picea abies	29	Cladonia coccifera	13
Vaccinium uliginosum	27	Dicranum flexicaule	13
Calluna vulgaris	22	Cetraria ericetorum	11
Cladonia arbuscula	18	Solidago virgaurea	11
Cladonia deformis	18		

G3.C - [Larix] taiga woodland

European Forest Type: n/a

Origin of data (countries): n/a

List of alliances: PIC-02B, PIC-05A

Additional selection rules: Instead of the relevés belonging to the listed alliances, relevés with a cover of Larix sibirica > 15% and at the same time higher than any other tree species were assigned to this EUNIS type, provided these relevés were the areas north of 57°N

Implications for EUNIS classification: proposed new name: Larix taiga woodland

Implications for EFT classification: n/a

Floristic composition:
No data

G3.D - Boreal bog conifer woodland

European Forest Type: 11.1 Spruce mire forest, 11.2 Pine mire forest

Origin of data (countries): FI

List of alliances: OXY-02B, PIC-05A, VAC-01A, VAC-01B, VAC-02A, VAC-03A

Additional selection rules: From the listed alliances only those relevés with a cover of Picea abies, P. obovata, Pinus sylvestris or Larix sibirica > 5% were assigned to this category; in addition, relevés not assigned to these alliances but having a cover of these tree species > 5% and at the same time a cover of Sphagnum magellanicum, S. fuscum, S. fallax, S. flexuosum, S. angustifolium, S. rubellum or S. russowii > 50% were assigned; relevés from other areas than Norway, Sweden, Finland, Estonia and Russia north of 57°N were excluded

Implications for EUNIS classification: proposed new name: Boreal bog conifer woodland

Implications for EFT classification: n/a

Floristic composition:

Deschampsia flexuosa	100	Molinia caerulea	50
Juniperus communis	100	Pinus sylvestris	50
Picea abies	100	Vaccinium uliginosum	50
Solidago virgaurea	100	Vaccinium vitis-idaea	50
Sphagnum russowii	100	Andromeda polifolia	25
Trientalis europaea	100	Cornus suecica	25
Vaccinium myrtillus	100	Dicranum polysetum	25
Betula pubescens	75	Empetrum nigrum agg.	25
Carex globularis	75	Gymnocarpium dryopteris	25
Dicranum fuscescens	75	Linnaea borealis	25
Hylocomium splendens	75	Lycopodium annotinum	25
Mylia anomala	75	Maianthemum bifolium	25
Polytrichum commune	75	Phegopteris connectilis	25
Sorbus aucuparia	75	Sphagnum recurvum agg.	25
Alnus incana	50	Sphagnum teres	25
Barbilophozia lycopodioides	50	Vaccinium oxycoccos agg.	25
Melampyrum pratense	50		

G3.E - Nemoral bog conifer woodland

European Forest Type: 11.1 Spruce mire forest, 11.2 Pine mire forest

Origin of data (countries): AT, BG, CZ, DE, DU, ES, FR, GB, PL, SI, SK

List of alliances: OXY-02B, VAC-01A, VAC-01B, VAC-02A

Additional selection rules: From the listed alliances, only those relevés with a cover of Picea abies, Pinus sylvestris or P. uncinata v. rotundata > 5% were assigned to this category; in addition, relevés not assigned to these alliances but having a cover of these tree species > 5% and at the same time a cover of Sphagnum magellanicum, S. fuscum, S. fallax, S. flexuosum, S. angustifolium, S. rubellum or S. russowii > 50% were assigned; relevés from Norway, Sweden, Finland, Estonia and Russia north of 57°N were excluded

Implications for EUNIS classification: proposed new name: Temperate bog conifer woodland

Implications for EFT classification: n/a

Floristic composition:

Vaccinium myrtillus	75	Deschampsia flexuosa	20
Sphagnum recurvum agg.	73	Melampyrum pratense	20
Picea abies	68	Andromeda polifolia	18
Eriophorum vaginatum	67	Dicranum scoparium	18
Vaccinium vitis-idaea	58	Drosera rotundifolia	18
Sphagnum magellanicum	57	Eriophorum angustifolium	18
Vaccinium oxycoccos agg.	56	Frangula alnus	18
Pinus sylvestris	53	Pinus uncinata var. rotundata	18
Vaccinium uliginosum	47	Calamagrostis villosa	17
Molinia caerulea	45	Potentilla erecta	16
Betula pubescens	41	Carex echinata	15
Calluna vulgaris	39	Sphagnum russowii	15
Pleurozium schreberi	38	Carex rostrata	13
Polytrichum commune	38	Sphagnum girgensohnii	13
Polytrichum strictum	36	Dryopteris carthusiana agg.	12
Carex nigra	27	Sorbus aucuparia	12
Aulacomnium palustre	23	Betula pendula	11
Ledum palustre	21	Trientalis europaea	11
Sphagnum capillifolium	21		

Appendix E: List of Data Contributors

Country	*Data sources*	*Contact*
Austria	Austrian Vegetation database	Wolfgang Willner
Balkans	Vegetation databases, Literature	Andraž Čarni
Croatia	Vegetation Databases of Croatia	Željko Škvorc
Czech Rep.	Czech National Phytosoc. Database	Milan Chytrý
France	SOPHY database	Henry Brisse
Germany	VegMV (Mecklenburg-Vorpommern)	Florian Jansen
	GVRD Halle	Ute Jandt
Greece	Hellenic Natura 2000 Database	Panayotis Dimopoulos
Hungary	Vegetation Database of Hungary	János Csiky
Ireland	Irish Vegetation Database	Una Fitzpatrick
Italy	Database of La Sapienza University	Emiliano Agrillo
		Nicola Alessi
		Fabio Attorre
Netherlands	Dutch National Vegetation Database	Joop Schaminée
		Stephan Hennekens
Poland	Polish Vegetation Database	Zygmunt Kącki
Romania	Vegetation DB of forests of Romania	Adrian Indreica
Russia	Vegetation database from Urals	Vassiliy Martynenko
Russia	Vegetation DB Lower Volga valley	Valentin Golub
		Aleksei Sorokin
Scandinavia	Nordic database Consortium	Jonathan Lenoir

		Jörg Brunet
Slovakia	Slovak Vegetation Database	Jozef Šibík
Slovenia	Vegetation Database of Slovenia	Andraž Čarni
		Urban Šilc
Spain/Portugal	SIVIM Database	Xavier Font
Ukraine	Database of Botanical Institute Kiev	Yakiv Didukh
		Viktor Onyshchenko
UK	British NVC Database	John Rodwell